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Passiflora.

PASSIFLORA, or **PASSION-FLOWER**: A genus of the pentandria order, belonging to the gynandria class of plants; and in the natural method ranking under the 34th order, *Cucurbitaceæ*. The calyx is pentaphyllous; there are five petals; the nectarium a crown; the berry is pedicillated. There are near 30 different species; all of them natives of warm foreign countries, only one of which is sufficiently hardy to succeed well in the open ground here; all the others requiring the shelter of a green-house or stove, but chiefly the latter. The most remarkable are,

1. The *cærulea*, or blue-rayed common palmated passion-flower, hath long, slender, shrubby, purplish-green stalks, branchy, and ascending upon support by their clasps 30 or 40 feet high; with one large palmated leaf at each joint, and at the axillas large spreading flowers, with whitish-green petals, and a blue radiated nectarium; succeeded by a large, oval, yellowish fruit. It flowers from July until October; the flowers are very large, conspicuous, and their composition is exceedingly curious and beautiful. The general structure of the singular flowers of this plant is, they come out at the axillas on pedunculi about three inches long, which they terminate, each flower having just close under the calyx a three-lobed involucre-like appendage; a five-lobed calyx, and a five-petalous corolla, the size, figure, and colour of the calyx, &c. the petals arranging alternately with the calicinal lobes; the whole, including the involucre, calyx, and corolla, make just 13 lobes and petals, all expanded flat: and within the corolla is the nectarium, composed of a multitude of thread-like fibres, of a blue and purple colour, disposed in circular rays round the column of the fructification; the outer ray is the longest, flat, and spreading on the petals; the inner is short, erect, and narrows towards the centre: in the middle is an erect cylindric club-shaped column or pillar, crowned with the roundish germen, having at its base five horizontal spreading filaments, crowned with incumbent yellow antheræ, that move about every way; and from the side of the germen arise three slender spreading styles, terminated by headed stigmas: the germen afterwards gradually becomes a large oval fleshy fruit, ripening to a yellowish colour.—These wonderful flowers are only of one day's duration, generally opening about 11 or 12 o'clock, and frequently in hot sunny weather burst open with elasticity, and continue fully expanded all that day: and the next they gradually close, assuming a decayed-like appearance, and never open any more; the evening puts a period to their existence, but they are succeeded by new ones

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daily on the same plant.—This plant and flowers are held in great veneration in some foreign Catholic countries, where the religious make the leaves, tendrils, and different parts of the flower, to represent the instruments of our blessed Saviour's passion; hence the name *passiflora*.

2. The *incarnata*, incarnated, or flesh coloured Italian passion-flower, hath a strong perennial root; slender, herbaceous stalks, rising upon support four or five feet high; leaves composed of three sawed lobes, each leaf attended by a twining tendril; and at the axillas long slender pedunculi, terminated each by one whitish flower, having a greenish calyx, and a reddish or purple radiated nectarium, surrounding the column of the fructification, which succeed to a large, round, fleshy fruit, ripening to a beautiful orange colour.—The flowers of this species are also very beautiful, though of short duration, opening in the morning, and night puts a period to their beauty; but they are succeeded by a daily supply of new ones.—The fruit of this sort is also very ornamental, as ripening to a fine reddish orange colour; but these rarely attain perfection here, unless the plants are placed in the stove; therefore when there is such accommodation, it highly merits that indulgence, where it will exhibit both flowers and green and ripe fruit, all at the same time, in a beautiful manner.

3. The *vespertilio*, or bat's-wing passion-flower, hath slender, striated, branchy stalks; large, bilobate, or two-lobed leaves, the base roundish and glandular, the lobes acute, widely divaricated like a bat's wings, and dotted underneath; and axillary flowers, having white petals and rays. The leaves of this species have a singular appearance, the two lobes being expanded six or seven inches wide, resembling the wings of a bat upon flight; hence the name *vespertilio*.

As all the species are natives of warm climates, in this country they are mostly of a tender quality, except the first sort, which succeeds very well in the full ground, in a warm situation; only their young branches are sometimes killed in very severe winters; but plenty of new ones generally rise again in spring following: the others, denominated *stove kinds*, must always be retained in that repository.

PASSION, is a word of which, as Dr Reid observes, the meaning is not precisely ascertained either in common discourse or in the writings of philosophers. In its original import, it denotes every *feeling* of the mind occasioned by an extrinsic cause; but it is generally used to signify some *agitation* of mind, opposed to that state of tranquillity in which a man is most

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master

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Passion. master of himself. That it was thus used by the Greeks and Romans, is evident from Cicero's rendering *παθος*, the word by which the philosophers of Greece expressed it; by *perturbatio* in Latin. In this sense of the word, passion cannot be itself a *distinct* and *independent* principle of action; but only an occasional degree of vehemence given to those dispositions, desires, and affections, which are at all times present to the mind of man; and that this is its proper sense, we need no other proof than that passion has always been conceived to bear analogy to a storm at sea or to a tempest in the air.

With respect to the number of passions of which the mind is susceptible, different opinions have been held by different authors. Le Brun, a French writer on painting, justly considering the expression of the passions as a very important as well as difficult branch of his art, has enumerated no fewer than twenty, of which the signs may be expressed by the pencil on canvass. That there are so many different states of mind producing different effects which are visible on the features and the gestures, and that those features and gestures ought to be diligently studied by the artist, are truths which cannot be denied; but it is absurd to consider all these different states of mind as *passions*, since tranquillity is one of them, which is the reverse of passion.

The common division of the passions into *desire* and *aversion*, *hope* and *fear*, *joy* and *grief*, *love* and *hatred*, has been mentioned by every author who has treated of them, and needs no explication; but it is a question of some importance in the philosophy of the human mind, whether these different passions be each a degree of an original and innate disposition, distinct from the dispositions which are respectively the foundations of the other passions, or only different modifications of one or two general dispositions common to the whole race.

The former opinion is held by all who build their system of metaphysics upon a number of distinct internal senses; and the latter is the opinion of those who, with Locke and Hartley, resolve what is commonly called instinct into an early association of ideas. (See *INSTINCT*). That without deliberation mankind instantly feel the passion of fear upon the apprehension of danger, and the passion of anger or resentment upon the reception of an injury, are truths which cannot be denied: and hence it is inferred, that the seeds of these passions are innate in the mind, and that they are not generated, but only swell to magnitude on the prospect of their respective objects. In support of this argument, it has been observed that children, without any knowledge of their danger, are instinctively afraid on being placed on the brink of a precipice; and that this passion contributes to their safety long before they acquire, in any degree equal to their necessities, the exercise of their rational powers. Deliberate anger, caused by a voluntary injury, is acknowledged to be in part founded on reason and reflection; but where anger impels one suddenly to return a blow, even without thinking of doing mischief, the passion is instinctive. In proof of this, it is observed, that instinctive anger is frequently raised by bodily pain, occasioned even by a stick or a stone, which instantly becomes an object of resentment, that we are violently

Passion. incited to crush to atoms. Such conduct is certainly not rational, and therefore it is supposed to be necessarily instinctive.

With respect to other passions, such as the lust of power, of fame, or of knowledge, innumerable instances, says Dr Reid, occur in life, of men who sacrifice to them their ease, their pleasure, and their health. But it is absurd to suppose that men should sacrifice the end to what they desire only as means of promoting that end; and therefore he seems to think that these passions must be innate. To add strength to this reasoning, he observes, that we may perceive some degree of these principles even in brute animals of the more sagacious kind, who are not thought to desire means for the sake of ends which they have in view.

But it is in accounting for the passions which are disinterested that the advocates for innate principles seem most completely to triumph. As it is impossible not to feel the passion of pity upon the prospect of a fellow-creature in distress, they argue, that the basis of that passion must be innate; because pity, being at all times more or less painful to the person by whom it is felt, and frequently of no use to the person who is its object, it cannot in such instances be the result of deliberation, but merely the exertion of an original instinct. The same kind of reasoning is employed to prove that gratitude is the exercise of an innate principle. That good offices are, by the very constitution of our nature, apt to produce good will towards the benefactor, in good and bad men, in the savage and in the civilized, cannot surely be denied by any one in the least acquainted with human nature. We are grateful not only to the benefactors of ourselves as individuals, but also to the benefactors of our country; and *that*, too, when we are conscious that from our gratitude neither they nor we can reap any advantage. Nay, we are impelled to be grateful even when we have reason to believe that the objects of our gratitude know not our existence. This passion cannot be the effect of reasoning, or of association founded on reasoning; for, in such cases as those mentioned, there are no principles from which reason can infer the propriety or usefulness of the feeling. That *public spirit*, or the affection which we bear to our country, or to any subordinate community of which we are members, is founded on instinct; is deemed so certain, that the man destitute of this affection, if there be any such, has been pronounced as great a monster as he who has two heads.

All the disinterested passions are founded on what philosophers have termed *benevolent affection*. Instead therefore of enquiring into the origin of each passion separately, which would swell this article to no purpose, let us listen to one of the finest writers as well as ablest reasoners of the age, treating of the origin of benevolent affection, "We may lay it down as a principle (says Dr Reid †), that all benevolent affections are in their nature agreeable; that it is essential to them to desire the good and happiness of their objects; and that their objects must therefore be beings capable of happiness. A thing may be desired either on its own account, or as the means in order to something else. That only can properly be called an object of desire which is desired upon its own account; and

Essays on the active Powers of Man.

Passion. and therefore I consider as benevolent those affections only which desire the good of their object ultimately, and not as means in order to something else. To say that we desire the good of others, only to procure some pleasure or good to ourselves, is to say that there is no benevolent affection in human nature. This indeed has been the opinion of some philosophers both in ancient and in later times. But it appears as unreasonable to resolve all benevolent affections into self-love, as it would be to resolve hunger and thirst into self-love. These appetites are necessary for the preservation of the individual. Benevolent affections are no less necessary for the preservation of society among men; without which men would become an easy prey to the beasts of the field. The benevolent affections planted in human nature, appear therefore no less necessary for the preservation of the human species than the appetites of hunger and thirst." In a word, pity, gratitude, friendship, love, and patriotism, are founded on different benevolent affections; which our learned author holds to be original parts of the human constitution.

This reasoning has certainly great force; and if authority could have any weight in settling a question of this nature, we know not that name to which greater deference is due than the name of him from whom it is taken. Yet it must be confessed that the philosophers, who consider the affections and passions as early and deep-rooted associations, support their opinion with very plausible arguments. On their principles we have endeavoured elsewhere to account for the passions of fear and love, (see *INSTINCT* and *LOVE*); and we may here safely deny the truth of what has been stated respecting fear, which seems to militate against that account. We have attended with much solicitude to the actions of children; and have no reason to think that they feel terror on the brink of a precipice till they have been repeatedly warned of their danger in such situations by their parents or their keepers. Every person knows not only that they have no original or instinctive dread of fire, which is as dangerous to them as any precipice; but that it is extremely difficult to keep them from that destructive element till they are either capable of weighing the force of arguments, or have repeatedly experienced the pain of being burnt by it. With respect to sudden resentment, we cannot help considering the argument, which is brought in proof of its being instinctive, as proving the contrary in a very forcible manner. Instinct is some mysterious influence of God upon the mind exciting to actions of beneficial tendency: but can any benefit arise from wrecking our impotent vengeance on a stock or a stone? or is it supposable that a Being of infinite wisdom would excite us to actions so extravagantly foolish? We learn from experience to defend ourselves against rational or sensible enemies by retaliating the injuries which they inflict upon us; and if we have been often injured in any particular manner, the idea of that injury becomes in time so closely associated with the means by which it has been constantly repelled, that we never receive such an injury—a blow for instance—without being prompted to make the usual retaliation, without reflecting whether the object be sensible or insensible. So far from being instinctive does resentment appear to us, that

we think an attentive observer may easily perceive how the seeds of it are gradually infused into the youthful mind; when the child, from being at first a timid creature shrinking from every pain, learns by degrees to return blow for blow and threat for threat.

But instead of urging what appears to ourselves of most weight against the instinctive system, we shall lay before our readers a few extracts from a dissertation on the Origin of the Passions by a writer whose elegance of language and ingenuity of investigation do honour to the school of Hartley.

"When an infant is born (says Dr Sayers*), there is every reason to suppose that he is born without ideas. These are rapidly communicated through the medium of the senses. The same senses are also the means of conveying to him pleasure and pain. These are the hinges on which the passions turn: and till the child is acquainted with these sensations, it would appear that no passion could be formed in his mind; for till he has felt pleasure and pain, how can he desire any object, or wish for its removal? How can he either love or hate? Let us observe then the manner in which love and hatred are formed; for on these passions depend all the rest. When a child endures pain, and is able to detect the cause of it, the idea of pain is connected in his mind with that of the thing which produced it; and if the object which occasioned pain be again presented to the child, the idea of pain associated with it arises also. This idea consequently urges the child to avoid or to remove the object; and thus arises the passion of dislike or hatred. In the same manner, the passion of liking or love is readily formed in the mind of a child from the association of pleasant ideas with certain objects which produced them.

"The passions of hope and fear are states of the mind depending upon the good or bad prospects of gratifying love or hatred; and joy or sorrow arises from the final success or disappointment which attends the exertions produced by love or by hatred. Out of these passions, which have all a perceptible relation to our own good, and are universally acknowledged to be selfish, all our other passions are formed."

To account for the passions called *disinterested*, he observes, that in the history of the human mind we find many instances of our dropping an intermediate idea, which has been the means of our connecting two other ideas together; and that the association of these two remains after the link which originally united them has vanished. Of this fact the reader will find sufficient evidence in different articles of this work (See *INSTINCT*, n° 19, and *METAPHYSICS*, n° 101): and, to apply it to the disinterested passions, let us suppose, with Dr Sayers, that any individual has done to us many offices of kindness, and has consequently much contributed to our happiness; it is natural for us to seek with some anxiety for the continuance of those pleasures which he is able to communicate. But we soon discern, that the surest way of obtaining the continuance of his friendly offices is to make them, as much as possible, a source of pleasure to himself. We therefore do every thing in our power to promote his happiness in return for the good he has conferred upon us, that thus we may attach him to us as much as we are able. Hitherto all is plainly selfish. We have been evidently endeavouring, for the sake of our own future

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* *Disquisitions Metaphysical and Literary.*

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gratification, to promote the happiness of this person: but observe the consequence. We have thus, by contemplating the advantage to be derived to ourselves from promoting the prosperity of our friend, learned to associate a set of pleasant ideas with his happiness; but the link which has united them gradually escapes us, while the union itself remains. Continuing to associate pleasure with the well-being of our friend, we endeavour to promote it for the sake of his *immediate* gratification, without looking farther; and in this way his happiness, which was first attended to only as a means of future enjoyment, finally becomes an end. Thus then the passion which was originally selfish, is at length *disinterested*; its gratification being completed merely by its success in promoting the happiness of another."

In this way does our author account for the origin of gratitude; which at last becomes a habit, and flows spontaneously towards every man who has either been or intended to be our benefactor. According to him, it is easy to observe also, that from associating pleasure with the happiness of an individual when we procure it ourselves, it must of course soon follow, that we should experience pleasure from a view of his happiness any way produced; such happiness raising at all times pleasant ideas when it is presented to our minds. This is another feature of a disinterested affection, to feel delight from the mere increase of happiness in the object whom we love.

"It may be objected, perhaps, that parents seem to have an *instinctive* disinterested love of their offspring: but surely the love of a parent (A) for a new-born infant is not usually equal to that for a child of four or five years old. When a child is first born, the prospect and hopes of future pleasure from it are sufficient to make a parent anxious for its preservation. As the child grows up, the hope of future enjoyment from it must increase: hence would pleasure be associated with the well-being of the child, the love of which would of course become in due time disinterested."

Our author does not analyse *pity*, and trace it to its source in selfishness; but he might easily have done it, and it has been ably done by his master. Pity or compassion is the uneasiness which a man feels at the misery of another. It is generated in every mind during the years of childhood; and there are many circumstances in the constitution of children, and in the mode of their education, which make them particularly susceptible of this passion. The very appearance of any kind of misery which they have experienced, or of any signs of distress which they understand, excite

in their minds painful feelings, from the remembrance of what they have suffered, and the apprehension of their suffering it again. We have seen a child a year old highly entertained with the noise and struggles made by its elder brother when plunged naked into a vessel filled with cold water. This continued to be the case for many days, till it was thought proper to plunge the younger as well as the elder; after which the daily entertainment was soon at an end. The little creature had not been itself plunged above twice till it ceased to find diversion in its brother's sufferings.—On the third day it cried with all the symptoms of the bitterest anguish upon seeing its brother plunged, though no preparation was then made for plunging itself: but surely this was not disinterested sympathy, but a feeling wholly selfish, excited by the remembrance of what it had suffered itself, and was apprehensive of suffering again. In a short time, however, the painful feelings accompanying the sight of its brother's struggles, and the sound of his cries, were doubtless so associated with that sight and that sound, that the appearance of the latter would have brought the former along with them, even though the child might have been no longer under apprehension of a plunging itself. This association, too, would soon be transferred to every boy in the same circumstances, and to similar sounds and struggles, from whatever cause they might proceed.

Thus, as Dr Hartley observes §, "when several children are educated together, the pains, the denials of pleasure, and the sorrows which affect one, generally extend to all in some degree, often in an equal one. When their parents, companions, or attendants are sick or afflicted, it is usual to raise in their minds the nascent ideas of pains and miseries by such words and signs as are suited to their capacities. They also find themselves laid under many restraints, on account of the sickness or affliction of others; and when these and such like circumstances have raised in their minds desires to remove the causes of their own internal feelings, *i. e.* to ease the miseries of others, a variety of internal feelings and desires become so blended and associated together, as that no part can be distinguished separately from the rest, and the child may properly be said to have compassion. The same sources of compassion remain, though with some alteration, during our whole progress through life. This is so evident, that a reflecting person may plainly discern the constituent parts of his compassion while they are yet the mere internal and, as one may say, selfish feelings above-mentioned; and before they have put on the nature of com-

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§ Observations on Man.

(A) That this is true of the father is certain; but it may be questioned whether it be equally true of the mother. A woman is no sooner delivered of her infant, than she caresses it with the utmost possible fondness. We believe, that if she were under the necessity of making a choice between her child of four years, and her infant an hour old, she would rather be deprived of the latter than of the former; but we are not convinced that this would proceed from a less degree of affection to the infant than to the child. She knows that the child has before his fourth year escaped many dangers which the infant must encounter, and may not escape; and it is therefore probable that her choice would be the result of prudent reflection. Though we are not admirers of that philosophy which supposes the human mind a bundle of instincts, we can as little approve of the opposite scheme, which allows it no instincts at all. The *sympathy* of a mother to her new-born infant is undoubtedly instinctive, as the only thing which at that moment can be associated with it in her mind is the pain she has suffered in bringing it to the world.

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compassion, by coalescence with the rest. Agreeably to this method of reasoning, it may be observed, that persons whose nerves are easily irritable, and those who have experienced great trials and afflictions, are in general more disposed to compassion than others; and that we are most apt to pity others in those diseases and calamities which we either have felt or of which we apprehend ourselves to be in danger."

The origin of patriotism and public spirit is thus traced by Dr Sayers: "The pleasures which our country affords are numerous and great. The wish to perpetuate the enjoyment of those pleasures, includes the wish to promote the safety and welfare of our country, without which many of them would be lost. All this is evidently selfish; but, as in the progress of gratitude, it finally becomes disinterested. Pleasant ideas are thus strongly connected with the welfare of our country, after the tie which first bound them together has escaped our notice. The prosperity which was at first desirable as the means of future enjoyment, becomes itself an end: we feel delight in such prosperity, however produced; and we look not beyond this immediate delight. It is thus not difficult to observe in what manner a general and disinterested benevolence takes place in a mind which has already received pleasure from the happiness of a few; the transition is easy towards associating it with *happiness in general*, with the happiness of any being, whether produced by ourselves or by any other cause whatever."

From this reasoning, our author concludes, that all our passions may be traced up to original feelings of regard for ourselves. "Thus (in the forcible language of a learned writer † of the same school) does self-love, under the varying appearance of natural affection, domestic relation, and the connections of social habit, at first work blindly on, obscure and deep, in dirt: But as it makes its way, it continues rising, till it emerges into light; and then suddenly expiring, leaves behind it the fairest issue,"—benevolent affection.

Self-love forsook the path it first pursu'd,
And found the private in the public good.

Thus have we stated the two opposite theories respecting the origin of passions in the mind, and given our readers a short specimen of the reasonings by which they are supported by their respective patrons. Were we called upon to decide between them, we should be tempted to say, that they have both been carried to extremes by some of their advocates, and that the truth lies in the middle between them. "It is impossible * but that creatures capable of pleasant and painful sensations, should love and choose the one, and dislike and avoid the other. No being who knows what happiness and misery are, can be supposed indifferent to them, without a plain contradiction. Pain is not a possible object of desire, nor happiness of aversion." To prefer a greater good though distant, to a less good that is present; or to choose a present evil, in order to avoid a greater future evil—is indeed wise and rational conduct; but to choose evil ultimately, is absolutely impossible. Thus far then must be admitted, that every being possessed of sense and intellect, necessarily desires his own good as soon as he knows what it is; but if this knowledge be not innate, neither can the desire. Every human being comes into the world

with a capability of knowledge, and of course with a capability of affections, desires, and passions; but it seems not to be conceivable how he can actually love, or hate, or dread any thing, till he know whether it be good, or ill, or dangerous. If, therefore, we have no innate ideas, we cannot possibly have innate desires or aversions. Those who contend that we have, seem to think, that without them reason would be insufficient, either for the preservation of the individual or the continuation of the species; and some writers have alleged, that if our affections and passions were the mere result of early associations, they would necessarily be more capricious than we ever find them. But this objection seems to arise from their not rightly understanding the theory of their antagonists. The disciples of Locke and Hartley do not suppose it possible for any man in society to prevent such associations from being formed in his mind as shall necessarily produce desires and aversions; far less do they think it possible to form associations of ideas utterly repugnant, so as to desire that as good which his senses and intellect have experienced to be evil. Associations are formed by the very same means, and at the very same time, that ideas and notions are impressed upon the mind; but as pain is never mistaken for pleasure by the senses, so an object which has given us only pain, is never associated with any thing that makes it desirable. We say an object that has given us only pain, because it is possible to form such an association between life and the loss of a limb, as to make us grateful to the surgeon by whom it was amputated. Associations being formed according to the same laws by which knowledge is acquired, it by no means follows that passions resulting from them should be more capricious than they are found to be; and they certainly are sufficiently capricious to make us suspect that the greater part of them has this origin, rather than that they are all infused into the mind by the immediate agency of the Creator. If man be a being formed with no innate ideas, and with no other instinctive principles of action than what are absolutely necessary to preserve his existence and perpetuate the species, it is easy to perceive why he is placed in this world as in a state of probation, where he may acquire habits of virtue to fit him for a better. It is likewise easy to perceive why some men are better than others, and why some are the slaves of the most criminal passions. But all this is unintelligible, upon the supposition that the seeds of every passion are innate, and that man is a compound of reason and of instincts so numerous and various as to suit every circumstance in which he can be placed.

If passions, whatever be their origin, operate instantaneously, and if they be formed according to fixed laws, it may be thought a question of very little importance whether they be instinctive or acquired.—This was long our own opinion; but we think, that upon maturer reflection we have seen reason to change it. If passions be the result of early associations, it is of the utmost consequence that no improper associations be formed in the minds of children, and that none of their unreasonable desires be gratified. Upon this theory it seems indeed to depend almost wholly upon education, whether a child shall become a calm, benevolent, steady, and upright man; or a passionate, capricious,

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† Warburton.

* Dr Price's Review, &c.

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precious, selfish, miscreant. By teaching him to resent every petty injury, the seeds of irascibility are sown in his mind, and take such root, that before the age of manhood he becomes intolerable to all with whom he must converse. By exciting numberless desires in his youthful mind, and instantly gratifying them, you make him capricious, and impatient of disappointment; and by representing other children as in any degree inferior to him, you inspire him with the hateful passion of pride. According to the instinctive theory, education can only augment or diminish the strength of passions; according to the other theory, it is the source of by far the greater part of them. On either supposition, parents should watch with solicitude over the actions of their children; but they will surely think themselves obliged to be doubly watchful, if they believe, that through their neglect their children may acquire hateful passions, to which, if properly educated, they might have remained strangers thro' their whole lives. And let it be remembered, that this solicitude should begin at an early period; because the mind is susceptible of deep associations much sooner than is sometimes imagined. Without this susceptibility, no language could be learned; and therefore a child by the time he learns to speak, may have planted in his mind the seeds of passions, on the just regulation and subordination of which depends in a great measure the happiness of mankind. See *MORAL Philosophy*, Part I. Chap. 1, & 2. Part III. n° 216.

PASSIONS and Emotions, difference between them. See *EMOTIONS and Passions*.

External Signs of Emotions and PASSIONS. So intimately connected are the soul and body, that every agitation in the former produces a visible effect upon the latter. There is, at the same time, a wonderful uniformity in that operation; each class of emotions and passions being invariably attended with an external appearance peculiar to itself. These external appearances, or signs, may not improperly be considered as a natural language, expressing to all beholders emotions and passions as they arise in the heart. Hope, fear, joy, grief, are displayed externally: the character of a man can be read in his face; and beauty, which makes so deep an impression, is known to result, not so much from regular features and a fine complexion, as from good-nature, good-sense, sprightliness, sweetness, or other mental quality, expressed upon the countenance. Though perfect skill in that language be rare, yet what is generally known is sufficient for the ordinary purposes of life. But by what means we come to understand the language, is a point of some intricacy. It cannot be by sight merely; for upon the most attentive inspection of the human visage, all that can be discerned are, figure, colour, and motion, which, singly or combined, never can represent a passion nor a sentiment: the external sign is indeed visible; but to understand its meaning, we must be able to connect it with the passion that causes it; an operation far beyond the reach of eye-sight. Where then is the instructor to be found that can unveil this secret connection? If we apply to experience, it is yielded, that from long and diligent observation, we may gather, in some measure, in what manner those we are acquainted with express their passions externally: but with respect to

strangers, we are left in the dark: and yet we are not puzzled about the meaning of these external expressions in a stranger, more than in a bosom-companion. Further, had we no other means but experience for understanding the external signs of passion, we could not expect any uniformity, nor any degree of skill, in the bulk of individuals: yet matters are so much better ordered, that the external expressions of passion form a language understood by all, by the young as well as the old, by the ignorant as well as the learned: We talk of the plain and legible characters of that language; for undoubtedly we are much indebted to experience, in deciphering the dark and more delicate expressions. Where then shall we apply for a solution of this intricate problem, which seems to penetrate deep into human nature? Undoubtedly if the meaning of external signs be not derived to us from sight, nor from experience, there is no remaining source whence it can be derived but from nature.

We may then venture to pronounce, with some degree of confidence, that man is provided by nature with a sense or faculty that lays open to him every passion by means of its external expressions. And we cannot entertain any reasonable doubt of this, when we reflect, that the meaning of external signs is not hid even from infants: an infant is remarkably affected with the passions of its nurse expressed on her countenance; a smile cheers it, a frown makes it afraid: but fear cannot be without apprehending danger; and what danger can the infant apprehend, unless it be sensible that its nurse is angry? We must therefore admit, that a child can read anger in its nurse's face; of which it must be sensible intuitively, for it has no other mean of knowledge. We do not affirm, that these particulars are clearly apprehended by the child; for to produce clear and distinct perceptions, reflection and experience are requisite: but that even an infant, when afraid, must have some notion of its being in danger, is evident.

That we should be conscious intuitively of a passion from its external expressions, is conformable to the analogy of nature: the knowledge of that language is of too great importance to be left upon experience; because a foundation so uncertain and precarious, would prove a great obstacle to the formation of societies. Wisely therefore is it ordered, and agreeably to the system of providence, that we should have nature for our instructor.

Such is the philosophy of Lord Kames, to which objections unanswerable may be made. It is part of the instinctive system of metaphysics, which his Lordship has carried farther than all who wrote before him, and perhaps farther than all who have succeeded him in this department of science. That a child intuitively reads anger in its nurse's face, is so far from being true, that for some short time after birth it is not terrified by the most menacing gestures. It is indeed absolutely incapable of fear till it has suffered pain, (see *INSTINCT*); and could we constantly care it with what is called an *angry look*, it would be cheered by that look, and frightened at a smile. It feels, however, the effects of anger, and is soon capable of observing the peculiarity of feature with which that passion is usually accompanied; and these two become in a short time so linked together in its tender mind, that

Passion.

Elements
of Criticism.

Passion. that the appearance of the one necessarily suggests to it the reality of the other.

Should it be said that a loud and sudden noise startles a child immediately after birth, and that, therefore, the infant must be instinctively afraid, the fact may be admitted, without any necessity of admitting the inference. The nerves of an infant are commonly very irritable, and the strong impulse on the *auditory* nerves may agitate its whole frame, without inspiring it with the passion of fear. The loud noise is, in all probability, not the sign of approaching danger, but the immediate cause of real pain, from which the infant shrinks, as it would from the prick of a pin, or the scorching of a candle. But we have said enough in the article immediately preceding, and in others which are there quoted, to show how the passions may be formed by associations even in early infancy, and yet operate as if they were instinctive. This being the case, we shall through the remainder of this article suffer his Lordship to speak his own language, without making any further remarks upon it. We are induced to do this for two reasons; of which the first is, that many of our readers will probably prefer his theory to ours; and the second is, that his conclusions respecting the signs and language of passion hold equally good from either theory.

We perfectly agree with him, that manifold and admirable are the purposes to which the external signs of passion are made subservient by the Author of our nature.

1. The signs of internal agitation displayed externally to every spectator, tend to fix the signification of many words. The only effectual means to ascertain the meaning of any doubtful word, is an appeal to the thing it represents: and hence the ambiguity of words expressive of things that are not objects of external sense; for in that case an appeal is denied. Passion, strictly speaking, is not an object of external sense: but its external signs are: and by means of these signs, passions may be appealed to with tolerable accuracy: thus the words that denote our passions, next to those that denote external objects, have the most distinct meaning. Words signifying internal action and the more delicate feelings, are less distinct. This defect, with regard to internal action, is what chiefly occasions the intricacy of logic: the terms of that science are far from being sufficiently ascertained, even after much care and labour bestowed by an eminent writer*; to whom, however, the world is greatly indebted, for removing a mountain of rubbish, and moulding the subject into a rational and correct form. The same defect is remarkable in criticism, which has for its object the more delicate feelings; the terms that denote these feelings being not more distinct than those of logic.

2. Society among individuals is greatly promoted by that universal language. Looks and gestures give direct access to the heart; and lead us to select, with tolerable accuracy, the persons who are worthy of our confidence. It is surprising how quickly, and for the most part how correctly, we judge of character from external appearance.

3. After social intercourse is commenced, these external signs, which diffuse through a whole assembly the feelings of each individual, contribute above all

other means to improve the social affections. Language, no doubt, is the most comprehensive vehicle for communicating emotions: but in expedition, as well as in power of conviction, it falls short of the signs under consideration; the involuntary signs especially, which are incapable of deceit. Where the countenance, the tones, the gestures, the actions, join with the words in communicating emotions, these united have a force irresistible. Thus all the pleasant emotions of the human heart, with all the social and virtuous affections, are, by means of these external signs, not only perceived, but felt. By this admirable contrivance, conversation becomes that lively and animating amusement, without which life would at best be insipid: one joyful countenance spreads cheerfulness instantaneously through a multitude of spectators.

4. Dissocial passions, being hurtful by prompting violence and mischief, are noted by the most conspicuous external signs, in order to put us upon our guard: thus anger and revenge, especially when sudden, display themselves on the countenance in legible characters. The external signs, again, of every passion that threatens danger, raise in us the passion of fear: which frequently operating without reason or reflection, moves us by a sudden impulse to avoid the impending danger.

5. These external signs are remarkably subservient to morality. A painful passion, being accompanied with disagreeable external signs, must produce in every spectator a painful emotion: but then, if the passion be social, the emotion it produces is attractive, and connects the spectator with the person who suffers. Dissocial passions only are productive of repulsive emotions, involving the spectator's aversion; and frequently his indignation. This artful contrivance makes us cling to the virtuous, and abhor the wicked.

6. Of all the external signs of passion, those of affliction or distress are the most illustrious with respect to a final cause, and deservedly merit a place of distinction. They are illustrious by the singularity of their contrivance; and also by inspiring sympathy, a passion to which human society is indebted for its greatest blessing, that of providing relief for the distressed. A subject so interesting deserves a leisurely and attentive examination. The conformity of the nature of man to his external circumstances is in every particular wonderful: his nature makes him prone to society; and society is necessary to his well-being, because in a solitary state he is a helpless being, destitute of support, and in his distresses destitute of relief: but mental support, the shining attribute of society, is of too great moment to be left dependent upon cool reason; it is ordered more wisely, and with greater conformity to the analogy of nature, that it should be enforced even instinctively by the passion of sympathy. Here sympathy makes a capital figure; and contributes, more than any other means, to make life easy and comfortable. But however essential the sympathy of others may be to our well-being, one beforehand would not readily conceive how it could be raised by external signs of distress: for considering the analogy of nature, if these signs be agreeable, they must give birth to a pleasant emotion leading every beholder to be pleased with human woes: if disagreeable, as they undoubtedly are, ought they not naturally

Passion.

naturally to repel the spectator from them, in order to be relieved from pain? Such would be the reasoning beforehand; and such would be the effect were man purely a selfish being. But the benevolence of our nature gives a very different direction to the painful passion of sympathy, and to the desire involved in it: instead of avoiding distress, we fly to it in order to afford relief; and our sympathy cannot be otherwise gratified but by giving all the succour in our power. Thus external signs of distress, though disagreeable, are attractive: and the sympathy they inspire is a powerful cause, impelling us to afford relief even to a stranger, as if he were our friend or relation.

It is a noted observation, that the deepest tragedies are the most crowded: which in an overly view will be thought an unaccountable bias in human nature. Love of novelty, desire of occupation, beauty of action, make us fond of theatrical representations; and when once engaged, we must follow the story to the conclusion, whatever distress it may create. But we generally become wise by experience; and when we foresee what pain we shall suffer during the course of the representation, is it not surprising that persons of reflection do not avoid such spectacles altogether? And yet one who has scarce recovered from the distress of a deep tragedy, resolves coolly and deliberately to go to the very next, without the slightest obstruction from self-love. The whole mystery is explained by a single observation: That sympathy, though painful, is attractive; and attaches us to an object in distress, instead of prompting us to fly from it. And by this curious mechanism it is, that persons of any degree of sensibility are attracted by affliction still more than by joy.

To conclude: the external signs of passion are a strong indication, that man, by his very constitution, is framed to be open and sincere. A child, in all things obedient to the impulses of nature, hides none of its emotions; the savage and clown, who have no guide but pure nature, expose their hearts to view, by giving way to all the natural signs. And even when men learn to dissemble their sentiments, and when behaviour degenerates into art, there still remain checks, that keep dissimulation within bounds, and prevent a great part of its mischievous effects: the total suppression of the voluntary signs during any vivid passion, begets the utmost uneasiness, which cannot be endured for any considerable time: this operation becomes indeed less painful by habit; but luckily the involuntary signs cannot, by any effort, be suppressed nor even dissembled. An absolute hypocrisy, by which the character is concealed and a fictitious one assumed, is made impracticable; and nature has thereby prevented much harm to society. We may pronounce, therefore, that Nature, herself sincere and candid, intends that mankind should preserve the same character, by cultivating simplicity and truth, and banishing every sort of dissimulation that tends to mischief.

Influence of Passion with respect to our Perceptions, Opinions, and Belief. So intimately are our perceptions, passions, and actions, connected, it would be wonderful if they should have no mutual influence. That our actions are too much influenced by passion, is a known truth; but it is not less certain, though not so

well known, that passion hath also an influence upon our perceptions, opinions, and belief. For example, the opinions we form of men and things are generally directed by affection: An advice given by a man of figure hath great weight; the same advice from one in a low condition is despised or neglected: a man of courage under-rates danger; and to the indolent the slightest obstacle appears unsurmountable. All this may be accounted for by the simple principle of association.

There is no truth more universally known, than that tranquillity and sedateness are the proper state of mind for accurate perception and cool deliberation; and for that reason, we never regard the opinion even of the wisest man, when we discover prejudice or passion behind the curtain. Passion hath such influence over us, as to give a false light to all its objects. Agreeable passions prepossess the mind in favour of their objects; and disagreeable passions, not less against their objects: A woman is all perfection in her lover's opinion, while in the eye of a rival beauty she is awkward and disagreeable: when the passion of love is gone, beauty vanishes with it;—nothing is left of that genteel motion, that sprightly conversation, those numberless graces, which formerly, in the lover's opinion, charmed all hearts. To a zealot every one of his own sect is a saint, while the most upright of a different sect are to him children of perdition: the talent of speaking in a friend, is more regarded than prudent conduct in any other. Nor will this surprise any one acquainted with the world; our opinions, the result frequently of various and complicated views, are commonly so slight and wavering, as readily to be susceptible of a bias from passion.

With that natural bias another circumstance concurs, to give passion an undue influence on our opinions and belief; and that is a strong tendency in our nature to justify our passions as well as our actions, not to others only, but even to ourselves. That tendency is peculiarly remarkable with respect to disagreeable passions: by its influence, objects are magnified or lessened, circumstances supplied or suppressed, every thing coloured and disguised, to answer the end of justification. Hence the foundation of self-deceit, where a man imposes upon himself innocently, and even without suspicion of a bias.

We proceed to illustrate the foregoing observations by proper examples.

Gratitude, when warm, is often exerted upon the children of the benefactor; especially where he is removed out of reach by death or absence. The passion in this case being exerted for the sake of the benefactor, requires no peculiar excellence in his children: but the practice of doing good to these children produces affection for them, which never fails to advance them in our esteem. By such means, strong connections of affection are often formed among individuals, upon the slight foundation now mentioned.

Envy is a passion, which, being altogether unjustifiable, cannot be excused but by disguising it under some plausible name. At the same time, no passion is more eager than envy to give its object a disagreeable appearance: it magnifies every bad quality, and fixes on the most humbling circumstances:

Cassius.

Passion.

Cassius. I cannot tell what you and other men
Think of this life; but for my single self,
I had as lief not be, as live to be
In awe of such a thing as I myself.
I was born free as Cæsar, so were you;
We both have fed as well; and we can both
Endure the winter's cold as well as he.
For once, upon a raw and gusty day,
The troubled Tyber chafing with his shores,
Cæsar says to me, Dar'st thou, Cassius, now
Leap in with me into this angry flood,
And swim to yonder point?—Upon the word,
Accoutred as I was, I plunged in,
And bid him follow; so indeed he did.
The torrent roar'd, and we did buffet it
With lusty sinews; throwing it aside,
And stemming it with hearts of controversy.
But ere we could arrive the point propos'd,
Cæsar cry'd, Help me, Cassius, or I sink.
I, as Æneas, our great ancestor,
Did from the flames of Troy upon his shoulder
The old Anchises bear; so from the waves of Tyber
Did I the tired Cæsar: and this man
Is now become a god; and Cassius is
A wretched creature, and must bend his body
If Cæsar carelessly but nod on him.
He had a fever when he was in Spain;
And when the fit was on him, I did mark
How he did shake. 'Tis true, this god did shake;
His coward lips did from their colour fly;
And that same eye whose bend doth awe the world
Did lose its lustre: I did hear him groan;
Ay, and that tongue of his, that bade the Romans
Mark him, and write his speeches in their books,
Alas! it cry'd—Give me some drink, Titinius,—
As a sick girl. Ye gods, it doth amaze me,
A man of such a feeble temper should
So get the start of the majestic world,
And bear the palm alone. *Julius Cæsar, act. 1. sc. 3.*

Gloster, inflamed with resentment against his son
Edgar, could even force himself into a momentary
conviction that they were not related:

O strange fasten'd villain!

Would he deny his letter?—I never got him.

King Lear, act 2. sc. 3.

When by great sensibility of heart, or other means,
grief becomes immoderate, the mind, in order to justify
itself, is prone to magnify the cause; and if the
real cause admit not of being magnified, the mind seeks
a cause for its grief in imagined future events:

Busby. Madam, your majesty is much too sad:
You promis'd, when you parted with the king,
To lay aside self-harming heaviness,
And entertain a cheerful disposition.

Queen. To please the king, I did; to please myself,
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Passion.

I cannot do it. Yet I know no cause
Why I should welcome such a guest as grief;
Save bidding farewell to so sweet a guest
As my sweet Richard: yet again, methinks,
Some unborn sorrow, ripe in Fortune's womb,
Is coming tow'rd me; and my inward soul
With something trembles, yet at nothing grieves,
More than with parting from my lord the king.

Richard II. act 2. sc. 5.

Resentment at first is vented on the relations of the
offender, in order to punish him: but as resentment,
when so outrageous, is contrary to conscience, the
mind, to justify its passion, is disposed to paint these
relations in the blackest colours; and it comes at last
to be convinced, that they ought to be punished for
their own demerits.

Anger, raised by an accidental stroke upon a tender
part of the body, is sometimes vented upon the un-
designing cause. But as the passion in that case is ab-
surd, and as there can be no solid gratification in pu-
nishing the innocent, the mind, prone to justify as well
as to gratify its passion, deludes itself into a convic-
tion of the action's being voluntary. The conviction,
however, is but momentary; the first reflection shows
it to be erroneous: and the passion vanisheth almost
instantaneously with the conviction. But anger, the
most violent of all passions, has still greater influence:
it sometimes forces the mind to personify a stock or a
stone if it happen to occasion bodily pain, and even to
believe it a voluntary agent, in order to be a proper
object of resentment. And that we have really a mo-
mentary conviction of its being a voluntary agent,
must be evident from considering, that without such
conviction the passion can neither be justified nor gra-
tified: the imagination can give no aid; for a stock
or a stone imagined insensible, cannot be an object of
punishment, if the mind be conscious that it is an ima-
gination merely without any reality (A). Of such
personification, involving a conviction of reality, there
is one illustrious instance. When the first bridge of
boats over the Hellespont was destroyed by a storm,
Xerxes fell into a transport of rage, so excessive, that
he commanded the sea to be punished with 300 stripes;
and a pair of fetters to be thrown into it, enjoining the
following words to be pronounced: "O thou salt and
bitter water! thy master hath condemned thee to this
punishment for offending him without cause; and is
resolved to pass over thee in despite of thy insolence:
with reason all men neglect to sacrifice to thee, because
thou art both disagreeable and treacherous."

Herodotus lib. 7.

Shakespeare exhibits beautiful examples of the ir-
regular influence of passion in making us believe things
to be otherwise than they are. King Lear, in his dis-
tress, personifies the rain, wind, and thunder; and in
order to justify his resentment, believes them to be ta-
king part with his daughters:

B

Lear.

(A) We have already shown how a man may be instigated to wreck his vengeance on a stock or a stone, without ever considering whether it be sensible or insensible: (See PASSION). If the story of Xerxes be true, he may have considered the sea as sensible and animated, without dreaming that a stock or a stone is so. The sea was a god among many of the pagans, and was considered as such by Xerxes, or he could not have applauded men for not sacrificing to it.

Passion.

Lear. Rumble thy bellyful, spit fire, spout rain!
Nor rain, wind, thunder, fire, are my daughters.
I tax not you, ye elements, with unkindness;
I never gave you kingdoms, call'd you children;
You owe me no subscription. Then let fall
Your horrible pleasure.—Here I stand, your brave;
A poor, infirm, weak, and despis'd old man!
But yet I call you servile ministers,
That have with two pernicious daughters join'd
Your high-engender'd battles 'gainst a head
So old and white as this. Oh! oh! 'tis foul!

Act 3. sc. 2.

King Richard, full of indignation against his favourite
horse for carrying Bolingbroke, is led into the con-
viction of his being rational:

Groom. O, how it yearn'd my heart, when I beheld
In London streets, that coronation-day,
When Bolingbroke rode on Roan Barbary,
That horse that thou so often hast bestrid,
That horse that I so carefully have dressed!

K. Rich. Rode he on Barbary? tell me, gentle friend,
How went he under him?

Groom. So proudly as he had disdain'd the ground.

K. Rich. So proud that Bolingbroke was on his back!
That jade had eat bread from my royal hand!
This hand hath made him proud with clapping him.
Would he not stumble? would he not fall down,
(Since pride must have a fall), and break the neck
Of that proud man that did usurp his back?

Richard II. act 5. sc. 11.

Hamlet, swelled with indignation at his mother's se-
cond marriage, was strongly inclined to lessen the time
of her widowhood, the shortness of the time being a
violent circumstance against her; and he deludes him-
self by degrees into the opinion of an interval shorter
than the real one:

Hamlet. ——— That it should come to this!
But two months dead! nay, not so much; not two—
So excellent a king, that was, to this,
Hyperion to a satyr: so loving to my mother,
That he permitted not the wind of heav'n
Visit her face too roughly. Heav'n and earth!
Must I remember—why, she would hang on him,
As if increase of appetite had grown
By what it fed on: yet, within a month—
Let me not think—Frailty, thy name is *Woman*!
A little month! or ere those shoes were old,
With which she follow'd my poor father's body,
Like Niobe, all tears—why she, ev'n she—
(O heav'n! a beast, that wants discourse of reason,
Wou'd have mourn'd longer) married with mine uncle,
My father's brother; but no more like my father
Than I to Hercules. Within a month!—
Ere yet the salt of most unrighteous tears
Had left the flushing in her galled eyes,
She married—Oh, most wicked speed! to post
With such dexterity to incestuous sheets!
It is not, nor it cannot, come to good,
But break my heart, for I must hold my tongue.

Act 1. sc. 3.

The power of passion to falsify the computation of
time is remarkable in this instance; because time, which
hath an accurate measure, is less obsequious to our de-

fires and wishes, than objects which have no precise
standard of less or more.

Good news are greedily swallowed upon very slender
evidence; our wishes magnify the probability of
the event, as well as the veracity of the relater; and
we believe as certain what at best is doubtful:

Quel, che l'huom vede, amor li fa invisibile

E l'invisibil fa veder amore.

Questo creduto fu, che 'l miser suole

Dar facile credenza a' quel, che vuole.

Orland. Furios. cant. 1. st. 56.

For the same reason, bad news gain also credit upon
the slightest evidence: fear, if once alarmed, has the
same effect with hope, to magnify every circumstance
that tends to conviction. Shakespeare, who shows
more knowledge of human nature than any of our phi-
losophers, hath in his *Cymbeline* represented this bias
of the mind; for he makes the person who alone was
affected with the bad news, yield to evidence that did
not convince any of his companions. And *Othello* is
convinced of his wife's infidelity from circumstances
too slight to move any person less interested.

If the news interest us in so low a degree as to give
place to reason, the effect will not be altogether the
same: judging of the probability or improbability of
the story, the mind settles in a rational conviction ei-
ther that it is true or not. But even in that case, the
mind is not allowed to rest in that degree of convic-
tion which is produced by rational evidence: if the
news be in any degree favourable, our belief is raised
by hope to an improper height; and if unfavourable,
by fear.

This observation holds equally with respect to fu-
ture events: if a future event be either much wished
or dreaded, the mind never fails to augment the pro-
bability beyond truth.

That easiness of belief, with respect to wonders and
prodigies, even the most absurd and ridiculous, is a
strange phenomenon; because nothing can be more
evident than the following proposition, That the more
singular any event is, the more evidence is required to
produce belief: a familiar event daily occurring, being
in itself extremely probable, finds ready credit, and
therefore is vouched by the slightest evidence; but to
overcome the improbability of a strange and rare event,
contrary to the course of nature, the very strongest evi-
dence is required. It is certain, however, that won-
ders and prodigies are swallowed by the vulgar, upon
evidence that would not be sufficient to ascertain the
most familiar occurrence. It has been reckoned diffi-
cult to explain that irregular bias of mind; but we are
now made acquainted with the influence of passion up-
on opinion and belief; a story of ghosts or fairies, told
with an air of gravity and truth, raiseth an emotion of
wonder, and perhaps of dread; and these emotions im-
posing on a weak mind, impress upon it a thorough
conviction contrary to reason.

Opinion and belief are influenced by propensity as
well as by passion. An innate propensity is all we have
to convince us that the operations of nature are uni-
form: influenced by that propensity, we often rashly
think, that good or bad weather will never have an
end; and in natural philosophy, writers, influenced by
the same propensity, stretch commonly their analogical
reason-

Passion. reasonings beyond just bounds. See METAPHYSICS, n^o 133, 134.

Opinion and belief are influenced by affection as well as by propensity. The noted story of a fine lady and a curate viewing the moon through a telescope is a pleasant illustration: "I perceive (says the lady) two shadows inclining to each other; they are certainly two happy lovers:" "Not at all (replies the curate), they are two steeples of a cathedral."

Language of PASSION. Among the particulars that compose the social part of our nature, a propensity to communicate our opinions, our emotions, and every thing that affects us, is remarkable. Bad fortune and injustice affect us greatly; and of these we are so prone to complain, that if we have no friend nor acquaintance to take part in our sufferings, we sometimes utter our complaints aloud, even where there are none to listen.

But this propensity operates not in every state of mind. A man immoderately grieved, seeks to afflict himself, rejecting all consolation: immoderate grief accordingly is mute; complaining is struggling for consolation.

It is the wretch's comfort still to have
Some small reserve of near and inward wo,
Some unsuspected hoard of inward grief,
Which they unseen may wail, and weep, and mourn,
And glutton-like alone devour.

Mourning Bride, act 1. sc. 1.

When grief subsides, it then, and no sooner, finds a tongue: we complain, because complaining is an effort to disburden the mind of its distress. This observation is finely illustrated by a story which Herodotus records, b. 3. Cambyfes, when he conquered Egypt, made Psammeticus the king prisoner; and for trying his constancy, ordered his daughter to be dressed in the habit of a slave, and to be employed in bringing water from the river; his son also was led to execution with a halter about his neck. The Egyptians vented their sorrow in tears and lamentations: Psammeticus only, with a downcast eye, remained silent. Afterward meeting one of his companions, a man advanced in years, who, being plundered of all, was begging alms, he wept bitterly, calling him by his name. Cambyfes, struck with wonder, demanded an answer to the following question: "Psammeticus, thy master Cambyfes is desirous to know, why, after thou hadst seen thy daughter so ignominiously treated, and thy son led to execution, without exclaiming or weeping, thou shouldst be so highly concerned for a poor man, noway related to thee?" Psammeticus returned the following answer: "Son of Cyrus, the calamities of my family are too great to leave me the power of weeping; but the misfortunes of a companion, reduced in his old age to want of bread, is a fit subject for lamentation."

Surprise and terror are silent passions, for a different reason: they agitate the mind so violently, as for a time to suspend the exercise of its faculties, and among others the faculty of speech.

Love and revenge, when immoderate, are not more loquacious than immoderate grief. But when these passions become moderate, they set the tongue free, and, like moderate grief, become loquacious. Moderate love, when unsuccessful, is vented in complaints;

Passion. when successful, is full of joy expressed by words and gestures.

As no passion hath any long uninterrupted existence, nor beats always with an equal pulse, the language suggested by passion is not only unequal but frequently interrupted: and even during an uninterrupted fit of passion, we only express in words the more capital sentiments. In familiar conversation, one who vents every single thought, is justly branded with the character of *loquacity*; because sensible people express no thoughts but what make some figure: in the same manner, we are only disposed to express the strongest impulses of passion, especially when it returns with impetuosity after interruption.

It is elsewhere observed* that the sentiments ought* See the to be tuned to the passion, and the language to both. article *Sentiments.* Elevated sentiments require elevated language: tender sentiments ought to be clothed in words that are soft and flowing: when the mind is depressed with any passion, the sentiments must be expressed in words that are humble, not low. Words being intimately connected with the ideas they represent, the greatest harmony is required between them: to express, for example, an humble sentiment in high-sounding words, is disagreeable by a discordant mixture of feelings; and the discord is not less when elevated sentiments are dressed in low words:

Verfibus exponi tragicis res comica non vult.

Indignatur item privatis ac prope focco

Dignis carminibus narrari cœna Thyestæ.

Horat. Ars poet. l. 89.

This, however, excludes not figurative expression, which, within moderate bounds, communicates to the sentiment an agreeable elevation. We are sensible of an effect directly opposite, where figurative expression is indulged beyond a just measure: the opposition between the expression and the sentiment makes the discord appear greater than it is in reality.

At the same time, figures are not equally the language of every passion: pleasant emotions, which elevate or swell the mind, vent themselves in strong epithets and figurative expression; but humbling and dispiriting passions affect to speak plain:

Et tragicus plerumque dolet fermone pedestri.

Telephus et Peleus, cum pauper et exul uterque,

Projicit ampullas et sesquipedia verba,

Si curat cor spectantis tetigisse querela.

Horat. Ars poet. 95.

Figurative expression, being the work of an enlivened imagination, cannot be the language of anguish or distress. Otway, sensible of this, has painted a scene of distress in colours finely adapted to the subject: there is scarce a figure in it, except a short and natural simile with which the speech is introduced. Belvidera, talking to her father of her husband:

Think you saw what past at our last parting;
Think you beheld him like a raging lion,
Pacing the earth, and tearing up his steps,
Fate in his eyes, and roaring with the pain
Of burning fury; think you saw his one hand
Fix'd on my throat, while the extended other
Grasp'd a keen threat'ning dagger: oh, 'twas thus
We last embrac'd, when, trembling with revenge,

Passion. He dragg'd me to the ground, and at my bosom
Presented horrid death; cry'd out, My friends!
Where are my friends? swore, wept, rag'd, threaten'd,
For he yet lov'd, and that dear love preserv'd me [lov'd;
To this last trial of a father's pity.
I fear not death, but cannot bear a thought
That that dear hand should do th' unfriendly office.
If I was ever then your care, now hear me;
Fly to the senate, save the promis'd lives
Of his dear friends, ere mine be made the sacrifice.
Venice Preserv'd, act 5.

To preserve the forefaid resemblance between words and their meaning, the sentiments of active and hurrying passions ought to be dressed in words where syllables prevail that are pronounced short or fast; for these make an impression of hurry and precipitation. Emotions, on the other hand, that rest upon their objects, are best expressed by words where syllables prevail that are pronounced long or slow. A person affected with melancholy, has a languid and slow train of perceptions. The expression best suited to that state of mind, is where words, not only of long, but of many syllables, abound in the composition; and for that reason, nothing can be finer than the following passage:

In those deep solitudes, and awful cells,
Where heav'nly-pensive Contemplation dwells,
And ever-musing Melancholy reigns.
POPE, Eloisa to Abelard.

To preserve the same resemblance, another circumstance is requisite, that the language, like the emotion, be rough or smooth, broken or uniform. Calm and sweet emotions are best expressed by words that glide softly: surprise, fear, and other turbulent passions, require an expression both rough and broken.

It cannot have escaped any diligent inquirer into nature, that, in the hurry of passion, one generally expresses that thing first which is most at heart; which is beautifully done in the following passage:

Me, me; adsum qui feci: in me convertite ferrum,
O Rutuli, mea fraus omnis. *Aeneid. ix. 427.*

Passion has often the effect of redoubling words, the better to make them express the strong conception of the mind. This is finely imitated in the following examples.

————— Thou sun, said I, fair light!
And thou enlighten'd earth, so fresh and gay!
Ye hills and dales, ye rivers, woods, and plains!
And ye that live, and move, fair creatures! tell,
Tell, if ye saw, how came I thus, how here.—
Paradise Lost, b. viii. 273.

————— Both have sinn'd! but thou
Against God only; I, 'gainst God and thee:
And to the place of judgment will return;
There with my cries importune Heav'n, that all
The sentence, from thy head remov'd, may light
On me, sole cause to thee of all this wo;
Me! me! only just object of his ire.
Paradise Lost, b. x. 930.

In general, the language of violent passion ought to be broken and interrupted. Soliloquies ought to be

so in a peculiar manner: language is intended by nature for society; and a man when alone, though he always clothes his thoughts in words, seldom gives his words utterance, unless when prompted by some strong emotion; and even then by starts and intervals only. Shakespeare's soliloquies may be justly established as a model; for it is not easy to conceive any model more perfect. Of his many incomparable soliloquies, the two following only shall be quoted, being different in their manner.

Hamlet. Oh, that this too, too solid flesh, would
Thaw, and resolve itself into a dew! [melt,
Or that the Everlasting had not fix'd
His canon 'gainst self-slaughter! O God! O God!
How weary, stale, flat, and unprofitable,
Seem to me all the uses of this world!
Fie on't! O fie! 'tis an unweeded garden,
That grows to seed: things rank and gross in nature
Possess it merely.—That it should come to this!
But two months dead! nay, not so much; not two—
So excellent a king, that was, to this,
Hyperion to a satyr: so loving to my mother,
That he permitted not the winds of heav'n
Visit her face too roughly. Heav'n and earth!
Must I remember—why, she would hang on him,
As if increase of appetite had grown
By what it fed on: yet, within a month—
Let me not think—Frailty, thy name is Woman!
A little month! or ere these shoes were old,
With which she follow'd my poor father's body,
Like Niobe, all tears ——— why she, ev'n she ———
(O heav'n! a beast, that wants discourse of reason,
Would have mourn'd longer—) married with mine
uncle,
My father's brother; but no more like my father
Than I to Hercules. Within a month! ———
Ere yet the salt of most unrighteous tears
Had left the flushing in her galled eyes,
She married ——— Oh, most wicked speed, to post
With such dexterity to incestuous sheets!
It is not, nor it cannot come to good.
But break, my heart, for I must hold my tongue.
Hamlet, act 1. sc. 3.

Ford. Hum! ha! is this a vision? is this a dream?
“do I sleep? Mr Ford, awake; awake, Mr Ford;
“there's a hole made in your best coat, Mr Ford!
“this 'tis to be married! this 'tis to have linen and
“buck baskets? Well, I will proclaim myself what
“I am; I will now take the leacher; he is at my
“house; he cannot 'scape me; 'tis impossible he
“should; he cannot creep into a halfpenny purse,
“nor into a pepper-box. But lest the devil
“guides him should aid him, I will search impossible
“places; tho' what I am I cannot avoid, yet to be
“what I would not, shall not make me tame.”
Merry Wives of Windsor, act 3. sc. last.

These soliloquies are accurate and bold copies of nature: in a passionate soliloquy one begins with thinking aloud, and the strongest feelings only are expressed; as the speaker warms, he begins to imagine one listening, and gradually slides into a connected discourse.

How far distant are soliloquies generally from these models? So far indeed as to give disgust instead of pleasure.

Passion. pleasure. The first scene of Iphigenia in Tauris discovers that princess, in a soliloquy, gravely reporting to herself her own history. There is the same impropriety in the first scene of Alcestes, and in the other introductions of Euripides, almost without exception. Nothing can be more ridiculous; it puts one in mind of a most curious device in Gothic paintings, that of making every figure explain itself by a written label issuing from its mouth. The description which a parasite, in the Eunuch of Terence (*act 2. sc. 2.*) gives of himself, makes a sprightly soliloquy: but it is not consistent with the rules of propriety; for no man, in his ordinary state of mind and upon a familiar subject, ever thinks of talking aloud to himself. The same objection lies against a soliloquy in the Adelphi of the same author (*act 1. sc. 1.*) The soliloquy which makes the third scene *act third* of his *Heicyra*, is insufferable; for there Pamphilus, soberly and circumstantially, relates to himself an adventure which had happened to him a moment before.

Corneille is unhappy in his soliloquies: Take for a specimen the first scene of Cinna.

Racine is extremely faulty in the same respect. His soliloquies are regular harangues, a chain completed in every link, without interruption or interval: that of Antiochus in Berenice (*act 1. sc. 2.*) resembles a regular pleading, where the parties *pro* and *con* display their arguments at full length. The following soliloquies are equally faulty: *Bajazet*, *act 3. sc. 7.*; *Mithridate*, *act 3. sc. 4.*; and *act 4. sc. 5.*; *Iphigenia*, *act 4. sc. 8.*

Soliloquies upon lively or interesting subjects, but without any turbulence of passion, may be carried on in a continued chain of thought. If, for example, the nature and sprightliness of the subject prompt a man to speak his thoughts in the form of a dialogue, the expression must be carried on without break or interruption, as in a dialogue between two persons; which justifies Falstaff's soliloquy upon honour:

"What need I be so forward with Death, that calls not on me? Well, 'tis no matter, Honour pricks me on. But how if Honour prick me off, when I come on? how then? Can honour set a leg? No. Or an arm? No. Or take away the grief of a wound? No. Honour hath no skill in surgery then? No. What is Honour? A word.—What is that word *honour*? Air; a trim reckoning.—Who hath it? He that dy'd a Wednesday. Doth he feel it? No. Doth he hear it? No. Is it insensible then? Yea, to the dead. But will it not live with the living? No. Why? Detraction will not suffer it. Therefore I'll none of it; honour is a mere scutcheon: and so ends my catechism."

First Part, Henry IV. act 5. sc. 2.

And even without dialogue a continued discourse may be justified, where a man reasons in a soliloquy upon an important subject; for if in such a case it be at all excusable to think aloud, it is necessary that the reasoning be carried on in a chain; which justifies that admirable soliloquy in *Hamlet* upon life and immortality, being a serene meditation upon the most interesting of all subjects. And the same consideration will justify the soliloquy that introduces the 5th *act* of Addison's *Cato*.

Language ought not to be elevated above the tone of the sentiment. *Passion.*

Zara. Swift as occasion, I
Myself will fly; and earlier than the morn
Wake thee to freedom. Now 'tis late; and yet
Some news few minutes past arriv'd, which seem'd
To shake the temper of the king—Who knows
What racking cares disease a monarch's bed?
Or love, that late at night still lights his lamp,
And strikes his rays through dusk, and folded lids,
Forbidding rest, may stretch his eyes awake,
And force their balls abroad at this dead hour.
I'll try. *Mourning Bride, act 3. sc. 4.*

The language here is undoubtedly too pompous and laboured for describing so simple a circumstance as absence of sleep. In the following passage, the tone of the language, warm and plaintive, is well suited to the passion, which is recent grief: but every one will be sensible, that in the last couplet save one the tone is changed, and the mind suddenly elevated to be let fall as suddenly in the last couplet:

Il déteste à jamais sa coupable victoire,
Il renonce à la cour, aux humains, à la gloire;
Et se fuit lui-même, au milieu des deserts,
Il va cacher sa peine au bout de l'univers;
Là, soit que le soleil rendit le jour au monde,
Soit qu'il finit sa course au vaste sein de l'onde,
Sa voix faisoit redire aux echos attendris,
Le nom, le triste nom, de son malheureux fils.

Henriade, chant. viii. 229.

Light and airy language is unsuitable to a severe passion.

Imagery and figurative expression are discordant, in the highest degree, with the agony of a mother, who is deprived of two hopeful sons by a brutal murder. Therefore the following passage is undoubtedly in a bad taste:

Queen. Ah, my poor princes! ah, my tender babes!
My unblown flowers, new appearing sweets!
If yet your gentle souls fly in the air,
And be not fixt in doom perpetual,
Hover about me with your airy wings,
And hear your mother's lamentation.

Richard III. act 4. sc. 4.

Again:

K. Philip. You are as fond of grief as of your child.
Constance. Grief fills the room up of my absent child,
Lies in his bed, walks up and down with me,
Puts on his pretty looks, repeats his words,
Remembers me of all his gracious parts,
Stuffs out his vacant garment with his form;
Then have I reason to be fond of grief.

King John, act 3. sc. 9.

Thoughts that turn upon the expression instead of the subject, commonly called a *play of words*, being low and childish, are unworthy of any composition, whether gay or serious, that pretends to any degree of elevation.

In the *Amynta* of Tasso, the lover falls into a mere play of words, demanding how he who had lost himself, could find a mistress. And for the same reason,

the

Passion. the following passage in Corneille has been generally condemned :

Chimene. Mon pere est mort, Elvire, et la premiere épée
Dont s'est armée Rodrigue a sa trame coupée.
Pleurez, pleurez, mes yeux, et fondez-vous en eaux,
La moitié de ma vie a mis l'autre au tombeau,
Et m'oblige à venger, après ce coup funeste,
Celle que je n'ai plus, sur celle que me reste.

Cid, act 3. sc. 3.

To die is to be banish'd from myself :
And Sylvia is myself : banish'd from her,
Is self from self ; a deadly banishment !

Two Gentlemen of Verona, act 3. sc. 3.

Countess. I pray thee, Lady, have a better cheer :
If thou engross'st all the griefs as thine,
Thou robb'st me of a moiety.

All's well that ends well, act 3. sc. 3.

K. Henry. O my poor kingdom, sick with civil
blows !

When that my care could not with-hold thy riots,
What wilt thou do when riot is thy care ?
O, thou wilt be a wilderness again,
Peopled with wolves, thy old inhabitants.

Second Part, Henry IV. act 4. sc. 11.

Cruda Amarilli, che col nome ancora
D'amar, ah! lasso, amaramente insegna.

Pastor Fido, act 1. sc. 2.

Antony, speaking of Julius Cæsar :

O world ! thou wast the forest of this hart ;
And this, indeed, O world, the heart of thee.
How like a deer, stricken by many princes,
Dost thou here lie !

Julius Cæsar, act 3. sc. 3.

Playing thus with the sound of words, which is still
worse than a pun, is the meanest of all conceits. But
Shakespeare, when he descends to a play of words,
is not always in the wrong ; for it is done sometimes
to denote a peculiar character, as in the following
passage :

K. Philip. What say'st thou, boy ? look in the
lady's face.

Lewis. I do, my Lord, and in her eye I find
A wonder, or a wond'rous miracle ;
The shadow of myself form'd in her eye ;
Which being but the shadow of your son,
Becomes a son, and makes your son a shadow.
I do protest, I never lov'd myself
Till now infixed I beheld myself
Drawn in the flatt'ring table of her eye.

Faulconbridge. Drawn in the flatt'ring table of
her eye !

Hang'd in the frowning wrinkle of her brow !
And quarter'd in her heart ! he doth espy
Himself Love's traitor : this is pity now,
That hang'd, and drawn, and quarter'd there should be
In such a love so vile a lout as he.

King John, act 2. sc. 5.

A jingle of words is the lowest species of that low
wit, which is scarce sufferable in any case, and least of

all in an heroic poem : and yet Milton in some instances has descended to that puerility :

And brought into the world a world of wo.
— Begirt th' Almighty throne
Beseeching or besieging —
Which tempted our attempt —
At one slight bound high overleap'd all bound.
— With a shout
Loud as from numbers without number.

One should think it unnecessary to enter a caveat
against an expression that has no meaning, or no distinct
meaning ; and yet somewhat of that kind may be found
even among good writers.

Sebastian. I beg no pity for this mould'ring clay.
For if you give it burial, there it takes
Possession of your earth :
If burnt and scatter'd in the air ; the winds
That strow my dust, diffuse my royalty,
And spread me o'er your clime ; for where one atom
Of mine shall light, know there Sebastian reigns.

DRYDEN, Don Sebastian King of Portugal, act 1.

Cleopatra. Now, what news, my Charmion ?
Will he be kind ? and will he not forsake me ?
Am I to live or die ? nay, do I live ?
Or am I dead ? for when he gave his answer,
Fate took the word, and then I liv'd or dy'd.

DRYDEN, All for Love, act 2.

If she be coy, and scorn my noble fire,
If her chill heart I cannot move ;
Why, I'll enjoy the very love,
And make a mistress of my own desire.

COWLEY, poem inscribed "The Request."

His whole poem inscribed *My Picture* is a jargon of
the same kind.

— 'Tis he, they cry, by whom
Not men, but war itself is overcome.

Indian Queen.

Such empty expressions are finely ridiculed in the
Rehearsal.

Was't not unjust to ravish hence her breath,
And in life's stead to leave us nought but death ?

Act 4. sc. 1.

PASSIONS, in medicine, make one of the non-naturals, and produce very sensible effects. Joy, anger, and fear, are the principal. In the two first, the spirits are hurried with too great vivacity ; whereas, in fear or dread, they are as it were curbed and concentrated : whence we may conclude, that they have a very bad effect upon health ; and therefore it will be best to keep them within bounds as much as possible, and to preserve an inward serenity, calmness, and tranquillity.

PASSIONS, in painting, are the external expressions of the different dispositions and affections of the mind ; but particularly their different effects upon the several features of the face : for though the arms, and indeed every part of the body *, serve likewise, by their quick, languid, and variously diversified motions, to express the passions of the soul ; yet, in painting, this difference

* See *Oratory*, n° 20.

Passions. is most conspicuous in the face. See PAINTING, p. 620. and DRAWING, § 8.

As we have given engravings of Le Brun's drawings of the passions, we shall here subjoin the account which he has given of each of these heads. See Plates CCCLXXVIII and CCCLXXIX.

1. The effects of *attention* are, to make the eye-brows sink and approach the sides of the nose; to turn the eye-balls toward the object that causes it; to open the mouth, and especially the upper part; to decline the head a little, and fix it without any other remarkable alteration.

2. *Admiration* causes but little agitation in the mind, and therefore alters but very little the parts of the face; nevertheless the eye-brow rises; the eye opens a little more than ordinary; the eye-ball placed equally between the eye-lids appears fixed on the object; the mouth half opens, and makes no sensible alteration in the cheeks.

3. The motions that accompany *admiration with astonishment* are hardly different from those of simple admiration, only they are more lively and stronger marked; the eye-brows more elevated; the eyes more open; the eye-ball further from the lower eye-lid, and more steadily fixed: The mouth is more open, and all the parts in a much stronger emotion.

4. Admiration begets esteem, and this produces *veneration*, which, when it has for its object something divine or beyond our comprehension, makes the face decline, and the eye-brows bend down; the eyes are almost shut and fixed: the mouth is shut. These motions are gentle, and produce but little alterations in the other parts.

5. Although *rapture* has the same object as veneration, only considered in a different manner, its motions are not the same; the head inclines to the left side; the eye-balls and eye-brows rise directly up; the mouth half opens, and the two corners are also a little turned up: the other parts remain in their natural state.

6. The passion of *desire* brings the eye-brows close together and forwards toward the eyes, which are more open than ordinary; the eye-ball is inflamed, and places itself in the middle of the eye; the nostrils rise up, and are contracted towards the eyes; the mouth half opens, and the spirits being in motion give a lively glowing colour.

7. Very little alteration is remarked in the face of those that feel within themselves the *sweetness of joy*, or *joy with tranquillity*. The forehead is serene; the eye-brow without motion, elevated in the middle; the eye pretty open and with a laughing air; the eye-ball lively and shining; the corners of the mouth turn up a little; the complexion is lively; the cheeks and lips are red.

8. *Laughter*, which is produced by joy mixed with surprise, makes the eye-brows rise towards the middle of the eye, and bend towards the sides of the nose; the eyes are almost shut, and sometimes appear wet, or shed tears, which make no alteration in the face; the mouth half open, shows the teeth; the corners of the mouth drawn back, cause a wrinkle in the cheeks, which appear so swelled as to hide the eyes in some

measure; the nostrils are open, and all the face is of a red colour. *Passions.*

9. *Acute pain* makes the eye-brows approach one another, and rise towards the middle; the eye-ball is hid under the eye-brows; the nostrils rise and make a wrinkle in the cheeks; the mouth half opens and draws back: all the parts of the face are agitated in proportion to the violence of the pain.

10. *Simple bodily pain* produces proportionally the same motions as the last, but not so strong: The eye-brows do not approach and rise so much; the eye-ball appears fixed on some object; the nostrils rise, but the wrinkles in the cheeks are less perceivable; the lips are further asunder towards the middle, and the mouth is half open.

11. The dejection that is produced by *sadness* makes the eye-brows rise towards the middle of the forehead more than towards the cheeks; the eye-ball appears full of perturbation; the white of the eye is yellow; the eye-lids are drawn down, and a little swelled; all about the eyes is livid; the nostrils are drawn downward; the mouth is half open, and the corners are drawn down; the head carelessly leaning on one of the shoulders: the face is of a lead colour; the lips pale.

12. The alterations that *weeping* occasions are strongly marked: The eye-brows sink down towards the middle of the forehead; the eyes are almost closed, wet, and drawn down towards the cheeks; the nostrils swelled; the muscles and veins of the forehead appear; the mouth is shut, and the sides of it are drawn down, making wrinkles on the cheeks; the under lip pushed out, presses the upper one: all the face is wrinkled and contracted; its colour is red, especially about the eye-brows, the eyes, the nose, and the cheeks.

13. The lively attention to the misfortunes of another, which is called *compassion*, causes the eye-brows, to sink towards the middle of the forehead; the eye-ball to be fixed upon the object; the sides of the nostrils next the nose to be a little elevated, making wrinkles in the cheeks; the mouth to be open; the upper lip to be lifted up and thrust forwards; the muscles and all the parts of the face sinking down and turning towards the object which excites the passion.

14. The motions of *scorn* are lively and strong: The forehead is wrinkled; the eye-brow is knit; the side of it next the nose sinks down, and the other side rises very much; the eye is very open, and the eye-ball is in the middle; the nostrils rise, and draw towards the eyes, and make wrinkles in the cheeks; the mouth shuts, its sides sinking down, and the under-lip is pushed out beyond the upper one.

15. An object despised sometimes causes *horror*, and then the eye-brow knits, and sinks a great deal more. The eye-ball, placed at the bottom of the eye, is half covered by the lower eye-lid; the mouth is half open, but closer in the middle than the sides, which being drawn back, makes wrinkles in the cheeks; the face grows pale, and the eyes become livid; the muscles and the veins are marked.

16. The violence of *terror or fright* alters all the parts of the face; the eye-brow rises in the middle; its

Passions
Passive.

its muscles are marked, swelled, pressed one against the other, and sunk towards the nose, which draws up as well as the nostrils; the eyes are very open; the upper eye-lid is hid under the eye-brow; the white of the eye is encompassed with red; the eye-ball fixes toward the lower part of the eye; the lower part of the eye-lid swells and becomes livid; the muscles of the nose and cheeks swell, and these last terminate in a point toward the sides of the nostrils; the mouth is very open, and its corners very apparent; the muscles and veins of the neck stretched; the hair stands on end; the colour of the face, that is, the end of the nose, the lips, the ears, and round the eyes, is pale and livid; and all ought to be strongly marked.

17. The effects of *anger* show its nature. The eyes become red and inflamed; the eye-ball is staring and sparkling; the eye-brows are sometimes elevated and sometimes sunk down equally; the forehead is very much wrinkled, with wrinkles between the eyes; the nostrils are open and enlarged; the lips pressing against one another, the under one rising over the upper one leaves the corners of the mouth a little open, making a cruel and disdainful grin.

18. *Hatred or jealousy* wrinkles the forehead; the eye-brows are sunk down and knit; the eye-ball is half hid under the eye-brows, which turn towards the object; it should appear full of fire, as well as the white of the eye and the eye-lid; the nostrils are pale, open, more marked than ordinary, and drawn backward so as to make wrinkles in the cheeks; the mouth is so shut as to show the teeth are closed; the corners of the mouth are drawn back and very much sunk; the muscles of the jaw appear sunk; the colour of the face is partly inflamed and partly yellowish; the lips pale or livid.

19. As *despair* is extreme, its motions are so likewise; the forehead wrinkles from the top to the bottom; the eye-brows bend down over the eyes, and press one another on the sides of the nose; the eye seems to be on fire, and full of blood; the eye-ball is disturbed, hid under the eye-brow, sparkling and unfixed; the eye-lid is swelled and livid; the nostrils are large, open, and lifted up; the end of the nose sinks down; the muscles, tendons, and veins are swelled and stretched; the upper part of the cheeks is large, marked, and narrow towards the jaw; the mouth drawn backwards is more open at the sides than in the middle; the lower lip is large and turned out; they gnash their teeth; they foam; they bite their lips, which are pale; as is the rest of the face; the hair is strait and stands on end.

PASSION-Flower. See *PASSIFLORA*.

PASSION-Week, the week immediately preceding the festival of Easter; so called, because in that week our Saviour's passion and death happened. The Thursday of this week is called *Maunday Thursday*; the Friday, *Good-Friday*; and the Saturday, the *Great Sabbath*.

PASSIVE, in general, denotes something that suffers the action of another, called an *agent* or *active power*. In grammar, the verb or word that expresses this passion is termed a *passive verb*: which, in the learned languages, has a peculiar termination; as *amor*, *doceor*, &c. in Latin; that is an *r* is added to the actives *amo*, *doceo*: and, in the Greek, the inflection is made by changing ω into $\omicron\mu\alpha\iota$; as $\tau\upsilon\pi\omega$ $\tau\upsilon\pi\omicron\mu\alpha\iota$.

$\mu\alpha\iota$, &c. But, in the modern languages, the passive inflection is performed by means of auxiliary verbs, joined to the participle of the past tense; as, "I am praised," in Latin *laudor*, and in Greek $\epsilon\pi\alpha\iota\upsilon\omicron\mu\alpha\iota$; or, "I am loved," in Latin *amor*, and in Greek $\phi\iota\lambda\epsilon\omicron\mu\alpha\iota$. Thus it appears, that the auxiliary verb *am*, serves to form the passives of English verbs: and the same holds of the French; as, *Je suis loué*, "I am praised;" *j'ai été loué*, "I have been praised," &c. See **GRAMMAR**.

PASSIVE Title, in Scots law. See **LAW**, Part III. No clxxx. 30.

PASSIVE Obedience, a political doctrine which has been much misrepresented, and is, of course, very obnoxious to the friends of freedom. Some nonjurors, in the end of the last and in the beginning of the passing century, imagining that monarchy is the only lawful form of government, and that hereditary monarchy is the only lawful species of that government, have coupled with passive obedience the ridiculous notion of a divine, hereditary, indefeasible right of certain families to govern with despotic sway all other families of the same nation. The absurdity of this notion needs not to be dwelt upon; but it may not be improper to observe, that it has nothing to do with passive obedience.

As taught by the ablest reasoners, who think that they are supported by holy scripture, passive obedience is as much a duty under republican as under monarchical governments; and it means no more, but that private individuals are bound by the most solemn moral ties not to resist the supreme power wheresoever placed in any nation. The supreme power can only be the legislature; and no man or body of men, who have not the power of enacting and abrogating laws can, on this principle, claim passive obedience from any subject. Whether the principle be well or ill founded, the absurdity which commonly attaches to the phrase *passive obedience*, originates from the mistaken loyalty of the adherents of the house of Stuart, who to aggravate the illegality of the revolution, were wont to represent James II. as supreme over both houses of parliament, and of course over all law. That such reveries were foolish, we need no other evidence than the statute-book, which shows, that in the office of legislation, the king, lords, and commons, are co-ordinate; and that when any one of these powers shall take upon itself to counteract the other two, the duty of passive obedience will oblige the subject to support the legislature. That resistance to the legislature, if lawful on any occasion, can be so only to oppose the most violent tyranny, has been shown by Mr Hume with great cogency of argument, and is indeed a proposition self-evident. That it can never be lawful on any occasion, Bishop Berkeley endeavoured to prove by a chain of reasoning which it would be difficult to break. We enter not into the controversy, but refer our readers to *Hume's Essays* and *Berkeley's Passive Obedience and Nonresistance*, or, as it was intitled by a late editor, *the Measure of Submission to civil Government*. We shall only observe, that there is a great difference between *active* and *passive* obedience; and that many who consider themselves as bound on no account whatever to resist the supreme power, would yet suffer death rather than do an immoral action in obedience to any law of earthly origin.

PASSIONS.

Plate CCCLXXVIII.

Attention.



Veneration.



Admiration.



Admiration with Astonishment.



Joy with Tranquillity.



Rapture.



Desire.



Simple Bodily Pain.



Laughter.



Acute Pain.



PASSIONS.

Plate CCCLXXIX.
Compassion.

Sadness.



Weeping.



Scorn.



Horror.



Terror or Fright.



Anger.



Hatred or Jealousy.



Despair.



Ad Bell Pin. M. A. Sculptor fecit.

Passive,
Passover.

PASSIVE Prayer, among the *mystic divines*, is a total suspension or ligature of the intellectual faculties; in virtue whereof, the soul remains of itself, and as to its own power, impotent with regard to the producing of any effects. The passive state, according to Fenelon, is only passive in the same sense as contemplation is, *i. e.* it does not exclude peaceable, disinterested acts, but only unquiet ones, or such as tend to our own interest. In the passive state, the soul has not properly any activity, any sensation, of its own: it is a mere infinite flexibility of the soul, to which the feeblest impulse of grace gives motion.

PASSOVER, a solemn festival of the Jews, instituted in commemoration of their coming out of Egypt; because the night before their departure, the destroying angel, who put to death the first-born of the Egyptians, passed over the houses of the Hebrews without entering therein, because they were marked with the blood of the lamb which was killed the evening before, and which for this reason was called the *pascchal lamb*. This feast was called *pascha* by the old Greeks and Romans; not we presume from *πάσχω* "I suffer," as Chrysostom, Irenæus, and Tertullian, suppose, but from the Hebrew word *pesaph*, *passage*, *leap*. The following is what God ordained concerning the passover of the Jews, (Exod. xii.) The month of the coming forth from Egypt was looked upon from this time to be the first month of the sacred or ecclesiastical year, and the fourteenth day of this month, between the two vespers, that is, between the sun's decline and his setting: or rather, according to our manner of reckoning, between two o'clock in the afternoon and six o'clock in the evening at the equinox, they were to kill the pascchal lamb, and to abstain from leavened bread. The day following being the fifteenth, counting from six o'clock of the foregoing evening, which concluded the fourteenth, was the grand feast of the passover, which continued seven days. But it was only the first and the seventh day that were solemn. The lamb that was killed ought to be without any defect, a male, and yearned that year. If no lamb could be found, they might take a kid. They killed a lamb or a kid in every family; and if the number of those that lived in the house was not sufficient to eat a lamb, they might join two houses together. With the blood of the pascchal lamb they sprinkled the door-posts and lintel of every house, that the destroying angel, at the sight of the blood, might pass over them, and save the Hebrew children. They were to eat the lamb the same night that followed the sacrifice; they eat it roasted, with unleavened bread, and a sallad of wild lettuce. The Hebrew says literally, with bitter things, as suppose mustard, or any thing of this nature to give a relish. It was forbid to eat any part of it raw, or boiled in water, nor were they to break a bone, (Exod. xii. 46. Numb. ix. 12. John xix. 36.); and if any thing remained to the day following, it was thrown into the fire. They that eat it were to be in the posture of travellers, having their reins girt, their shoes on their feet, their staves in their hands, and eating in a hurry. But this last part of the ceremony was but little observed, at least it was of no obligation, but only upon that night they came forth out of Egypt. For the whole eight days of the passover no leavened bread

was to be used; and whoever should eat any, was threatened to be cut off from his people. With regard to the ceremonies which are observed in relation to the bread, see the article BREAD, p. 531. col. 2.

They kept the first and last day of the feast, yet so as that it was allowed to dress victuals, which was forbidden on the Sabbath-day. The obligation of keeping the passover was so strict, that whoever should neglect to do it, was condemned to death, (Numb. ix. 13.) But those who had any lawful impediment, as a journey, sickness, or any uncleanness, voluntary or involuntary; for example, those that had been present at a funeral, or by any other accident had been defiled, were to defer the celebration of the passover till the second month of the ecclesiastical year, or to the fourteenth day of the month Jiar, which answers to April and May. It was thus the Lord ordered Moses, upon the occasion of the inquiry of some Israelites, who had been obliged to pay their last offices to some of their relations, and who being thus polluted, were not capable of partaking of the pascchal sacrifice, (2 Chr. xxx. 1, 2, &c.) The modern Jews observe in general the same ceremonies that were practised by their ancestors, in the celebration of the passover. On the fourteenth of Nisan, the first-born fast in memory of God's smiting the first-born of the Egyptians. The morning prayers are the same with those said on other festivals. They take the roll of the pentateuch out of the chest, and read as far as the end of the twelfth chapter of Exodus, and what is contained in the eighteenth chapter of Numbers, relating to the passover. The matron of the family then spreads a table, and sets on it two unleavened cakes, and two pieces of the lamb, a shoulder boiled and another roasted, to put them in mind that God delivered them with a stretched-out arm. To this they add some small fishes, because of the leviathan; a hard egg, because of the ziz; some meal, because of the behemoth, (these three animals being appointed for the feast of the elect in the other life); and peas and nuts for the children, to provoke their curiosity to ask the reason of this ceremony. They likewise use a kind of mustard, which has the appearance of mortar, to represent their making bricks in Egypt. The father of the family sits down with his children and slaves, because on this day all are free. Being set down, he takes bitter herbs, and dips them in the mustard, then eats them, and distributes to the rest. Then they eat of the lamb, the history and institution of which is at that time recited by the master of the family. The whole repast is attended with hymns and prayers. They pray for the prince under whose dominion they live, according to the advice of Jeremiah (xxix. 7.), "Seek the peace of the city whither I have caused you to be carried away captives, and pray unto the Lord for it: for in the peace thereof shall ye have peace." See the article FEAST, &c. The same things are put in practice the two following days; and the festival is concluded by the ceremony habdala or distinction. This ceremony is performed at the closing of the Sabbath-day, at which time the master of the house pronounces certain benedictions, accompanied with certain formalities, requesting that every thing may succeed well the week following. After going out of the synagogue, they then eat leavened bread for the last time. (Leo of

Passover.

Passover,
Passport.

Modena, p. iii. c. 3. and the Rabbins.) While the temple was standing, they brought their lambs thither, and sacrificed them, offering the blood to the priest, who poured it out at the foot of the altar. The passover was typically predictive of Christ our christian passover, (1 Cor. v. 7.) As the destroying angel passed over the houses marked with the blood of the paschal lamb, so the wrath of God passes over them whose souls are sprinkled with the blood of Christ. The paschal lamb was killed before Israel was delivered, so it is necessary Christ should suffer before we could be redeemed. It was killed before Moses's law or Aaron's sacrifices were enjoined, to show that deliverance comes to mankind by none of them; but only the true passover, that Lamb of God slain from the foundation of the world, (Rom. iii. 25. Heb. ix. 14.) It was killed the first month of the year, which prefigured that Christ should suffer death in this month, (John xviii. 28.) It was killed in the evening, (Exod. xii. 6.) So Christ suffered in the last days, and at this time of the day, (Matt. xxvii. 46. Heb. i. 2.) At even also the sun sets, which shows that it was the Sun of Righteousness who was to suffer and die, and that at his passion universal darkness should be upon the whole earth, (Luke xxiii. 44.) The passover was roasted with fire, to denote the sharp and dreadful pains which Christ should suffer, not only from men, but from God also. It was to be eaten with bitter herbs, not only to put them in remembrance of their bitter bondage in Egypt, but also to typify our mortification to sin, and readiness to undergo afflictions for Christ, (Col. i. 24.) Many erroneously imagine, that the passover was instituted in memory of the Israelites passing the Red Sea; though it is certain the feast was held, and had its name, before the Israelites took a step of their way out of Egypt, and consequently several days before their passing the Red Sea. Besides the passover celebrated on the fourteenth of the first month, there was a second passover held on the fourteenth of the second month after the equinox, instituted by God in favour of travellers and sick persons, who could not attend at the first, nor be at Jerusalem on the day. The Greeks, and even some of the catholic doctors, from the thirteenth, eighteenth, and nineteenth, chapters, of St John, take occasion to conclude, that Jesus anticipated the day marked for the passover in the law; but the authority of three evangelists seems to evince the contrary. See Whitby's Dissertation on this subject, in an appendix to the fourteenth chapter of St Mark. F. Lamy supposes, that our Lord did not attend at the passover the last year of his life; which sentiment has drawn upon him abundance of opposers. F. Hardouin asserts, that the Galileans celebrated the passover on one day, and the Jews on another.

PASSPORT, or PASS, a licence or writing obtained from a prince or governor, granting permission and a safe conduct to pass through his territories without molestation: Also a permission granted by any state to navigate in some particular sea, without hinderance or molestation from it. It contains the name of the vessel, and that of the master, together with her tonnage and the number of her crew, certifying that she belongs to the subjects of a particular state, and requiring all persons at peace with that state to

suffer her to proceed on her voyage without interruption.

The violation of safe-conducts or passports expressly granted by the king or by his ambassadors to the subjects of a foreign power in time of mutual war, or committing acts of hostility against such as are in amity, league, or truce with us, who are here under a general implied safe-conduct, are breaches of the public faith, without which there can be no intercourse or commerce between one nation and another; and such offences may, according to the writers upon the law of nations, be a proper ground of a national war. And it is enacted by the statute 31 Hen. VI. cap. 4. still in force, that if any of the king's subjects attempt or offend upon the sea, or in any port within the king's obedience, or against any stranger in amity, league, or truce, or under safe-conduct, and especially by attacking his person, or spoiling him, or robbing him of his goods; the lord-chancellor, with any of the justices of either the king's-bench or common-pleas, may cause full restitution and amends to be made to the party injured. Pasquier says, that *passport* was introduced for *passé-par-tout*. Balzac mentions a very honourable passport given by an emperor to a philosopher in these terms: "If there be any one on land or sea hardy enough to molest Potamon, let him consider whether he be strong enough to wage war with Cæsar."

PASSPORT is used likewise for a licence granted by a prince for the importing or exporting merchandizes, moveables, &c. without paying the duties. Merchants procure such passports for certain kinds of commodities; and they are always given to ambassadors and ministers for their baggage, equipage, &c.

PASSPORT is also a licence obtained for the importing or exporting of merchandizes deemed contraband, and declared such by tariffs, &c. as gold, silver, precious stones, ammunition of war, horses, corn, wool, &c. upon paying duties.

PASSUS, among the Romans, a measure of length, being about four feet ten inches, or the thousandth part of a Roman mile. The word properly signifies, the space betwixt the feet of a man walking at an ordinary rate. See MEASURE.

PASTE, in cookery, a soft composition of flour, wrought up with proper fluids, as water, milk, or the like, to serve for cakes or coffins, therein to bake meats, fruits, &c. It is the basis or foundation of pyes, tarts, patties, pasties, and other works of pastry. It is also used in confectionary, &c. for a preparation of some fruit, made by beating the pulp thereof with some fluid or other admixture, into a soft pappy consistence, spreading it into a dish, and drying it with sugar, till it becomes as pliable as an ordinary paste. It is used occasionally also for making the crusts and bottoms of pyes, &c. Thus, with proper admixtures, are made almond pastes, apple pastes, apricot pastes, cherry, currant, lemon, plum, peach, and pear pastes.

PASTE is likewise used for a preparation of wheaten flour, boiled up and incorporated with water; used by various artificers, as upholsterers, saddlers, bookbinders, &c. instead of glue or size, to fasten or cement their cloths, leathers, papers, &c. When paste is used by bookbinders, or for paper-hangings to rooms, they mix a fourth, fifth, or sixth, of the weight of the flour of powdered resin; and where it is wanted still more tenacious,

Passport
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Paste.

Pastes
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Pastime.

nacious, gum arabic or any kind of size may be added. Paste may be preserved, by dissolving a little sublimate, in the proportion of a dram to a quart, in the water employed for making it, which will prevent not only rats and mice, but any other kind of vermin and insects, from preying upon it.

PASTES, in the glass trade, or the imitation or counterfeiting of gems in glass, see GEM, p. 603.

PASTEBOARD, a kind of thick paper, formed of several single sheets pasted one upon another. The chief use of pasteboard is for binding books, making letter-cases, &c. See PAPER.

PASTERⁿ of a HORSE, in the manege, is the distance betwixt the joint next the foot and the coronet of the hoof. This part should be short, especially in middle-sized horses; because long pasterns are weak, and cannot so well endure travelling.

PASTERⁿ-Joint, the joint next a horse's foot.

PASTIL, or PASTEL, among painters, a kind of paste made of different colours ground up with gum-water, in order to make CRAYONS.

PASTIL, in pharmacy, is a dry composition of sweet-smelling resins, aromatic woods, &c. sometimes burnt to clear and scent the air of a chamber.

PASTIME, a sport, amusement, or diversion. Pastimes of some kind seem to be absolutely necessary, and to none more than to the man of study; for the most vigorous mind cannot bear to be always bent. Constant application to one pursuit, if it deeply engage the attention, is apt to unhinge the mind, and to generate madness; of which the Don Quixote of Cervantes, and the astronomer of Johnson, are two admirably conceived instances. But though pastime is necessary to relieve the mind, it indicates great frivolity when made the business of life; and yet the rich and the great, who are not obliged to labour for the means of subsistence, too often rove from pastime to pastime with as constant assiduity as the mechanic toils for his family, or as the philosopher devotes himself to the cultivation of science. When those pastimes tend to give elasticity to the mind or strength to the body, such conduct is not only allowable, but praiseworthy; but when they produce effects the reverse of these, it is both hurtful and criminal. The gaming-table, the masquerade, the midnight assembly of any sort, must of necessity enfeeble both the body and the mind; and yet such are the fashionable amusements of the present day, to which many a belle and many a

beau sacrifice their beauty, their health, their quiet, and their virtue. Pastime.

Far different were the pastimes of our wiser ancestors: Remote from vice and effeminacy, they were innocent, manly, and generous exercises. From the ancient records of this country, it appears, that the sports, amusements, pleasures, and recreations, of our ancestors, as described by Fitz-Stephen (A), added strength and agility to the wheels of state mechanism, while they had a direct tendency towards utility. For most of these ancient recreations are resolvable into the public defence of the state against the attacks of a foreign enemy. The play at ball, derived from the Romans, is first introduced by this author as the common exercise of every school-boy. The performance was in a field, where the resort of the most substantial and considerable citizens, to give encouragement and countenance to this feat of agility, was splendid and numerous. The intention of this amusement at this period of time was to make the juvenile race active, nimble, and vigorous; which qualities were requisite whenever their assistance should be wanted in the protection of their country. The next species of pastime indeed does not seem to have this tendency; but it was only, as it seems, an annual custom: This was cock-fighting. The author tells us, that in the afternoon of Shrove-Tuesday, on which day this custom prevailed, they concluded the day in throwing the ball: which seems to insinuate, that the cock-fighting was merely in conformity to ancient usage, and limited only to part of the day, to make way for a more laudable performance. We may reasonably suppose, although this author is entirely silent upon this head, that while cock-fighting was going on, cock-throwing was the sport of the lowest class of people, who could not afford the expence of the former (B). Another species of manly exercise was truly martial, and intended to qualify the adventurers for martial discipline. It is related by Fitz-Stephen thus: "Every Friday in Lent, a company of young men comes into the field on horseback, attended and conducted by the best horsemen: then march forth the sons of the citizens, and other young men, with disarmed lances and shields; and there practise feats of war. Many courtiers likewise, when the king is near the spot, and attendants upon noblemen, do repair to these exercises; and while the hope of victory does inflame their minds, they show by good proof how serviceable they would be in martial affairs."

C 2

This

(A) Otherwise called William Stephanides, a monk of Canterbury, who lived in the reign of King Stephen, to the time of Richard I. He wrote a Latin treatise, in which he gives an account of the several pastimes which were countenanced in his time. Bale in his writings draws a pleasing portrait of him. He is likewise sketched in strong and forcible outlines of praise and commendation by Leland. Bale says thus of him: "The time which other people usually misemployed in an idle and frivolous manner, he consecrated to inquiries which tended to increase the fame and dignity of his country: in doing which, he was not unworthy of being compared to Plato; for, like him, he made the study of men and heaven his constant exercise."

(B) There were places set apart for the battles of these animals, as at this day, where no one was admitted without money. These places, or pits commonly called, were schools, as at this day, in which people were instructed in the doctrines of chance, loss and gain, betting and wagers, and particularly in the liberal art of laying two to one. Cock-throwing has been laudably abolished; for it was a species of cruelty towards an innocent and useful animal; and such a cruelty as would have kindled compassion in the heart of the rankest barbarian.

Pastime. This evidently is of Roman descent, and immediately brings to our recollection the *Ludus Trojae*, supposed to be the invention, as it was the common exercise, of Ascanius. The common people, in this age of masculine manners, made every amusement where strength was exerted the subject-matter of instruction and improvement: instructed to exert their bodily strength in the maintenance of their country's rights; and their minds improved, by such exertion, into every manly and generous principle.

In the vacant intervals of industry and labour, commonly called the holy-days, indolence and inactivity, which at this day mark this portion of time, were found only in those whose lives were distempered with age or infirmity. The view which Fitz-Stephen gives us of the Easter-holydays is animated. "In Easter-holydays they fight battles upon the water. A shield is hanged upon a pole, fixed in the middle of the stream. A boat is prepared without oars, to be borne along by the violence of the water; and in the forepart thereof standeth a young man, ready to give charge upon the shield with his lance. If so be that he break his lance against the shield, and doth not fall, he is thought to have performed a worthy deed. If without breaking his lance he runs strongly against the shield, down he falleth into the water; for the boat is violently forced with the tide: but on each side of the shield ride two boats, furnished with young men, who recover him who falleth soon as they may. In the holydays all the summer the youths are exercised in leaping, dancing, shooting, wrestling, casting the stone, and practising their shields; and the maidens trip with their timbrels, and dance as long as they can well see. In winter, every holyday before dinner, the boars prepared for brawn are set to fight, or else bulls or bears are baited."

These were the laudable pursuits to which leisure was devoted by our forefathers, so far back as the year 1130. Their immediate successors breathed the same generous spirit. In the year 1222, the 6th year of Henry III. we find, that certain masters in exercises of this kind made a public profession of their instructions and discipline, which they imparted to those who were

desirous of attaining excellence and victory in these *Pastime.* honourable achievements. About this period, the persons of better rank and family introduced the play of Tennis (c); and erected courts or oblong edifices for the performance of the exercise.

About the year 1253, in the 38th year of Henry III. the *Quintan* was a sport much in fashion in almost every part of the kingdom. This contrivance consisted of an upright post firmly fixed in the ground, upon the top of which was a cross piece of wood, moveable upon a spindle; one end of which was broad like the flat part of an halberd, while at the other end was hung a bag of sand. The exercise was performed on horseback. The masterly performance was, when, upon the broad part being struck with a lance, which sometimes broke it, the assailant rode swiftly on, so as to avoid being struck on the back by the bag of sand, which turned round instantly upon the stroke given with a very swift motion. He who executed this feat in the most dexterous manner was declared victor, and the prize to which he became intitled was a peacock. But if, upon the aim taken, the contender miscarried in striking at the broadside, his impotency of skill became the ridicule and contempt of the spectators.

Dr Plott, in his Natural History of Oxfordshire, tells us, that this pastime was in practice in his time at Deddington in this county. "They first (says this author) fixed a post perpendicularly in the ground, and then placed a small piece of timber upon the top of it, fastened on a spindle, with a board nailed to it on one end, and a bag of sand hanging at the other. Against this board they anciently rode with spears: now as I saw it at Deddington only with strong staves, which violently bringing about the bag of sand, if they make not good speed away, it strikes them in the neck or shoulders, and sometimes perhaps strikes them down from their horses; the great design of the sport being to try the agility both of man and horse, and to break the board; which, whoever did, was accounted conqueror: for whom heretofore there was some reward always appointed." (D)

Matthew Paris, speaking of this manly diversion, says,

(c) The word *Tennis* seems to owe its original to the French language: if so, the game is of French production. Yet the word *tenex* will hardly be found to afford incontrovertible evidence upon this subject. For the holding or keeping possession of the ball is no part of the game, but rather a circumstance casually attending it: since, during the performance of it, the ball is in continual motion, so there can be no *tenex* at this juncture. Perhaps a place in France called *Tennois* (as there is a town which differs only in a letter, called *Sennois*, in the district of Champagne) was the place where the balls were first made, and the game first introduced.

(D) This was certainly an exercise derived from a military institution of the Romans, though not instrumentally the same. Whoever considers the form and disposition of the Roman camps, which were formed into a square figure, will find there were four principal gates or passages. Near the *Quæstorium*, or Quæstor's apartment, was the *Forum*, or what is now called a sutling-house, and from being near the Quæstor's station called *Quæstorium forum*. At this part was a fifth gate *Quintana*, where the soldiers were instructed in the discipline of the *Palatia*, which was to aim at and strike their javelins against an upright post fixed in the ground, as a kind of *prolusion* to a real engagement with an enemy. By the frequent practice of this exercise, sometimes called *exercitium ad palum* by Roman writers, the soldiers at length acquired not only a dexterity and address in the management of their arms, but a constant and regular exactness in the direction of them. *Titus Livius Patavinus*, cap. 2. *Pancirollus Rerum Memorab.* lib. ii. tit. 21. *Vulturius in Augustanis Monumentis*, lib. li. p. 237.

Upon the irruption of the *Isuri* into the Roman camps, which they plundered, says Livius, *ad Quæstorium forum, quintanamque pervenerunt.*

Pastime. says, "The London youths made trial of their strength on horseback, by running at the *Quintan*; in doing which, whoever excelled all the rest was rewarded with a peacock." This sport is continued to this day in Wales; and being in use only upon marriages, it may be considered as a votive pastime, by which these heroic spirits seem to wish, that the male issue of such marriage may be as strong, vigorous, and active, as those who are at that time engaged in the celebration of this festive exertion of manhood. Virtuous exercises of this kind would be too rude and barbarous for the attendants on pleasure in the present age. The hand would tremble at the weight of the javelin; and the heart would pant upon the apprehension of personal insecurity. While these exertions of triumphant prowess continued, the sordid degeneracy of disposition, the supple baseness of temper, were unknown: for the love of country, as the Roman orator has wisely observed, *included all other virtues*. But if we guard the palace of honour, like the brazen castle of Danae, with every possible security, importunate corruption will be ever waiting at the gate, to seize an opportunity of intrusion. These feats of honourable contest were succeeded by the gilded banners of exhibition, and all the long train of dependents in the interest of indolence: for the writers of these times inform us, that the soft pleasures of the stage forced the passes to public favour in the year 1391, and likewise in the year 1409; so that utility, which before stood on the right hand of pleasure, was now ordered to withdraw for a season. The drama, it seems, was attempted by a set of useless and insignificant persons called *parish-clerks*; who, because they had the knowledge of the alphabet, ignorantly presumed that this included every other species of knowledge. The subject was truly serious, the creation of the world; but the performance must have been ludicrous. It was, however, honoured with the attendance of noble personages; and royalty itself deigned to cast a favourable eye upon it, for the king and queen were present. These interludes lasted no longer than the time requisite for the former consideration of utility and pleasure to resume its powers; as when the pliable bow by being too much bent is put out of shape, and by its elasticity recovers its former position. The lance, the shield, the ball, and the equestrian procession, came forward again, and put the dramatic usurper to flight. After this period, these objects of generous pleasure seem to have had their audience of leave, and one general object, indeed no less manly than the former, to have filled their stations, which was archery. This had a continuance to the reign of Charles I. for we find in many hospitals founded in that reign, among the articles of benefaction recorded upon their walls, this singular provision, *arms for the boys*, which signified *bows and arrows*.

Pastime. There are many places at this day, formerly resorted to, for the practice of this noble art, distinguished by appellations which indicate their ancient usage: such as Brentford Butts, Newington Butts, and many others of the like denomination. It appears from 33 Hen. VIII. that by the intrusion of other pernicious games, archery had been for a long time disused; to revive which this statute was made. It seems that the bows of the best kind were made of yew; and that this wood might be readily obtained for this purpose, yew-trees were planted in churchyards. The sons of those only who were persons of fortune and fashion, if under 17 years of age, were permitted to use such bows. The words of the statute are singular, and ran thus: "No person under seventeen years, except he, or his father or mother, have lands or tenements to the yearly value of ten pounds, or be worth in value or moveables the sum of forty marks sterling, shall shoot with any bow of yew, which shall be bought for him, after the feast of our Lady next coming, under the pain to lose and forfeit six shillings and eightpence." Two observations arise here upon these words. One, that the yew-wood, not being so common as other wood, might probably be soon found deficient, as it was the best wood for making bows, if not restrained in the use of it to particular ages and persons, as young people wantonly destroy what is put into their hands for useful purposes. The other observation is, that the age of 17 is by this statute distinguished as the age of discretion, when young people are more attentive and considerate in things of private concern; an age in these times which few ever arrive at, and some never. This statute makes provision of other kinds of wood for the common people in the following manner: "To the intent that every person may have bows of mean price, be it enacted, that every bowyer shall, for every bow that he maketh of yew, make four other bows, meet to shoot with, of elm, wich, hafill, ash, or other wood apt for the same, under pain to lose and forfeit for every such bow so lacking the sum of three shillings and fourpence." It seems there was a species of yew at this time called *elk*, which wood was stronger and more pliant than the common yew mentioned in this statute, and the price of it fixed. "Moreover, no bowyer shall sell or put to sale to any of the king's subjects, any bow of yew of the tax called *elk*, above the price of three shillings and fourpence, under the pain to forfeit twenty shillings for every bow sold above the said price."

From these several considerations which occur in this statute, we can trace three resplendent qualities, courage, strength, and agility; which three united, inspired two more, generosity and magnanimity. Upon the decline of this and other polished (E) amusements, a savage deformity of manners sprang up, but spangled.

(E) How widely different the conceptions of politeness at this day from what they were in the most refined ages of Greece and Rome! These two states agreed in fixing the standard of this accomplishment upon the fitness and propriety of things. We bend to an arbitrary imposture of language, trusting to the sense and meaning of our opposite Gallic neighbours, as if this island was at all times to be the foot-ball of that continent. To define politeness in its ancient and true sense, it is a manly exertion of conduct, founded upon every noble and virtuous principle. Gallic politeness is an effeminate impotence of demeanor, founded upon fallacy, evasion, and every insidious artifice. There can be no security, no happiness, no prosperity, awaiting this kingdom,

Pastime. spangled here and there with the opposite character of lazy opulence, which began now to erect her velvet standard in defiance of chaste and regular manners.

Towards the beginning of James I.'s reign, military prowess seems to have founded a retreat (F). He, to gratify the importunity of the common people, and at the same time to obviate his own fears upon a refusal, published a book of sports, in which the people had been some time before usually indulged on Sunday evenings, but which had been lately prohibited. These sports consisted of dancing, singing, wrestling, church ales, and other profanations of that day.

Charles, his successor, wisely, in the very entrance of his reign, abolished these sports. The act of Charles states the several amusements in part; by which we may conjecture what was the remainder as stated in the book of sports by James. It is necessary to transcribe that part of the act relating to this subject. "Forasmuch as there is nothing more acceptable to God, than the true and sincere worship of Him, and service according to His holy will, and that the holy keeping of the Lord's day is a principal part of the service of God, which in many places of this realm hath been, and now is, prophaned and neglected by a disorderly sort of people, in exercising and frequenting bear-baiting, bull-baiting, interludes, and common-plays, and other unlawful exercises and pastimes, neglecting divine service both in their own parishes and elsewhere: Be it enacted, that from and after forty days next after the end of this session of parliament, there shall be no meetings, assemblies, or concourse of people, out of their own parishes, on the Lord's day, within this realm of England, or any the dominions thereof, for any sports or pastimes whatsoever: nor any bear-baiting, bull-baiting, interludes, common plays, or other unlawful exercises or pastimes, used by any person or persons within their own parishes: and that every person and persons offending in any of the said premises, shall forfeit for every offence the sum of three shillings and fourpence; the same to be employed and converted to the use of the poor of the parish where such offence shall be committed." All this was perhaps proper, and showed the distinguished piety of this unfortunate monarch. But in this age likewise ended the manly sports of Britons, and nothing was introduced that could compensate for the loss.

All these lufury arts, considered as vehicles of pleasure, from the variety of their inventions, represent pleasure as a fleeting phantom: evincing at the same time the stability of happiness as springing from internal order. Even reflex acts, pregnant with future hopes of solace and social recreation, have more true feelings in expectancy than those which arise from the object in possession. Nay, pleasure is found frequently in the imagination only: for Ixion's disappointment frequently awaits us when we advance to embrace this Juno of our desires.

Upon the whole, happiness, the only thing of intrinsic value, must arise in the heart, and be something more solid than what mere amusement can possibly supply. Amusements or pastimes ought to be considered only as necessary relaxations from severer and more useful employment; and in this point of view they may be solely pursued; but they become criminal when they occupy the place of the business of life.

PASTINACA, the *PARSNEP*: A genus of the digynia order, belonging to the pentandria class of plants; and in the natural method ranking under the 45th order, *Umbellatæ*. The fruit is an elliptical compressed plane; the petals are involuted and entire. There are only two species of this genus; the principal of which is the *pastinaca sativa*, or garden-parsnep: which is an exceeding fine esculent root. It is to be propagated by sowing the seeds in February or March, in a rich mellow soil, which must be deep dug, that the roots may be able to run deep without hinderance.

It is a common practice to sow carrots at the same time, upon the same ground with the parsneps; and if the carrots are designed to be drawn young, there is no harm in it. The parsneps, when they are grown up a little, must be thinned to a foot distance, and carefully kept clear of weeds. They are finest tasted just at the season when the leaves are decayed: and such as are desirous to eat them in spring should have them taken up in autumn, and preserved in sand. When the seeds are to be sowed, some very strong and fine plants should be left four feet distance; and towards the end of August, or in the beginning of September, the seeds will be ripe: they must then be carefully gathered, and dried on a coarse cloth. They should always be sown the spring following; for they do not keep well.

Hints have been given and experiments made by agricultural societies, respecting parsneps, in order to raise them for winter food to cattle. It has long been a custom in some parts of Brittany, to sow parsneps in the open field for the food of cattle; as we are informed by the first volume of the Transactions of a Society instituted in that province, for the encouragement of the æconomical and commercial interests of their country. "It is of great importance (say they) that parsneps should be universally cultivated; because they afford an excellent and wholesome food for all kinds of cattle during the winter, and may be used to great advantage to fatten them. Our hogs have no other food in all that season, and our bullocks and oxen thrive well upon it. Our cows fed with parsneps give more milk than with any other winter fodder, and that milk yields better butter than the milk of cows nourished with any other substance. Our horses fatten with this food; though some pretend that it renders them less mettlesome, and hurts their legs and eyes. Cattle eat these roots raw at first sliced lengthwise;

kingdom, so long as we fawn to fashions that disgrace humanity, and to manners which consist of more than Punic perfidy.

(F) It hath been confidently asserted by some historians, that James was, during his whole life, struck with terror upon the sight of a drawn sword; which was the reason of his great unwillingness in bestowing the honour of knighthood. For at this juncture, he had such a tremor upon him, that instead of laying the sword upon the shoulder of the person to be knighted, he frequently would be observed almost to thrust the point of it into the face of the party: which occasioned those about him to assist him in the direction of his hand.

Pastophori
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Pasture.

lengthwise; and when they begin not to relish them, they are cut in pieces, put into a large copper, pressed down there, and boiled with only so much water as fills up the chafms between them. They then eat them very greedily, and continue to like them." See PANAX and OPOPANAX.

PASTOPHORI, amongst the ancients, were priests whose office it was to carry the images, along with the shrines of the gods, at solemn festivals, when they were to pray to them for rain, fair weather, or the like. The Greeks had a college of this order of priests in Sylla's time. The cells or apartments near the temples, where the pastophori lived, were called *pastophoria*. There were several lodging-rooms for the priests of a similar kind in the temple of Jerusalem.

PASTORAL, in general, something that relates to shepherds: hence we say, pastoral life, manners, poetry, &c.

Blair's
Lectures,
Vol. III.
p. 117.

Pastoral life may be considered in three different views; either such as it now actually is; when the state of shepherds is reduced to be a mean, servile, and laborious state; when their employments are become disagreeable, and their ideas gross and low: or such as we may suppose it once to have been, in the more early and simple ages, when it was a life of ease and abundance; when the wealth of men consisted chiefly in flocks and herds, and the shepherd, though unrefined in his manners, was respectable in his state: or, lastly, such as it never was, and never can in reality be, when, to the ease, innocence, and simplicity of the early ages, we attempt to add the polished taste, and cultivated manners, of modern times. Of these three states, the first is too gross and mean, the last too refined and unnatural, to be made the ground-work of pastoral poetry. Either of these extremes is a rock upon which the poet will split, if he approach too near it. We shall be disgusted if he give us too much of the servile employments and low ideas of actual peasants, as Theocritus is censured for having sometimes done; and if, like some of the French and Italian writers of pastorals, he makes his shepherds discourse as if they were courtiers and scholars, he then retains the name only, but wants the spirit of pastoral poetry.

PASTORAL Poetry. See POETRY, Part II. Sect. IV.

PASTRY, that branch of cookery which is chiefly taken up in making pies, pasties, cakes, &c. See PASTE.

Dr Cullen observes, that paste is very hard and indigestible without butter; and even with it, is apt to produce heart-burn and acescency. Perhaps this is increased by the burned butter, from a certain sensibility in the stomach, which occasions all empyreumatic oils to be long retained, and so turn rancous and acid.

PASTURE, or *PASTURE-Land*, is that reserved for feeding cattle.

Pasture-land is of such advantage to husbandry, that many prefer it even to corn-land, because of the small hazard and labour that attends it; and as it lays the foundation for most of the profit that is expected from the arable land, because of the manure afforded by the cattle which are fed upon it. Pasture ground is of two sorts; the one is meadow land, which is often overflowed; and the other is upland, which lies high

and dry. The first of these will produce a much greater quantity of hay than the latter, and will not require manuring or dressing so often: but then the hay produced on the upland is much preferable to the other; as is also the meat which is fed in the upland more valued than that which is fatted in rich meadows; though the latter will make the fatter and larger cattle, as is seen by those which are brought from the low rich lands in Lincolnshire. But where people are nice in their meat, they will give a much larger price for such as hath been fed on the downs, or in short upland pasture, than for the other, which is much larger. Besides this, dry pastures have an advantage over the meadows, that they may be fed all the winter, and are not so subject to poach in wet weather; nor will there be so many bad weeds produced; which are great advantages, and do in a great measure recompense for the smallness of the crop.

Pasture.

We have already mentioned the advantages of meadow land, or such as is capable of being overflowed with water, and given directions for draining and improving low pasture land, under the article MEADOW; therefore shall not repeat that here, but just mention some methods for improving of upland pasture.

The first improvement of upland pasture is, by fencing it, and dividing it into small fields of four, five, six, eight, or ten, acres each, planting timber trees in the hedge-rows, which will screen the grass from the dry pinching winds of March, which will prevent the grass from growing in large open lands; so that if April proves a dry month, the land produces very little hay; whereas in the sheltered fields, the grass will begin to grow early in March, and will cover the ground, and prevent the sun from parching the roots of the grass, whereby it will keep growing, so as to afford a tolerable crop if the spring should prove dry. But in fencing of land the inclosure must not be made too small, especially where the hedge-rows are planted with trees; because, when the trees are advanced to a considerable height, they will spread over the land; and where they are close, will render the grass sour; so that instead of being of an advantage, it will greatly injure the pasture.

The next improvement of upland pasture is, to make the turf good, where, either from the badness of the soil, or for want of proper care, the grass hath been destroyed by rushes, bushes, or mole-hills. Where the surface of the land is clayey and cold, it may be improved by paring it off, and burning it; but if it is an hot sandy land, then chalk, lime, marle, or clay, are very proper manures to lay upon it; but this should be laid in pretty good quantities, otherwise it will be of little service to the land.

If the ground is over-run with bushes or rushes, it will be of great advantage to the land to grub them up towards the latter part of summer, and after they are dried to burn them, and spread the ashes over the ground just before the autumnal rains; at which time the surface of the land should be levelled, and sown with grass-seed, which will come up in a short time, and make good grass the following spring. So also, when the land is full of mole-hills, these should be pared off, and either burnt for the ashes, or spread immediately

Pasture. immediately on the ground when they are pared off, observing to sow the bare patches with grass-seed just as the autumnal rains begin.

Where the land has been thus managed, it will be of great service to roll the turf in the months of February and March with an heavy wood roller; always observing to do it in moist weather, that the roller may make an impression; this will render the surface level, and make it much easier to mow the grass than when the ground lies in hills; and will also cause the turf to thicken, so as to have what the people usually term a *good bottom*. The grass likewise will be the sweeter for this husbandry, and it will be a great help to destroy bad weeds.

Another improvement of upland pastures is, the feeding of them; for where this is not practised, the land must be manured at least every third year; and where a farmer hath much arable land in his possession, he will not care to part with his manure to the pasture. Therefore every farmer should endeavour to proportion his pasture to his arable land, especially where manure is scarce, otherwise he will soon find his error; for the pasture is the foundation of all the profit which may arise from the arable land.

Whenever the upland pastures are mended by manure, there should be a regard had to the nature of the soil, and a proper sort of manure applied: as for instance, all hot sandy land should have a cold manure; neat's dung and swine's dung are very proper for such lands; but for cold lands, horse dung, ashes, and other warm manures, are proper. And when these are applied, it should be done in autumn, before the rains have soaked the ground, and rendered it too soft to cart on; and it should be carefully spread, breaking all the clods as small as possible, and then harrowed with bushes, to let it down to the roots of the grass. When the manure is laid on at this season, the rains in winter will wash down the salts, so that the following spring the grass will receive the advantage of it.

There should also be great care taken to destroy the weeds in the pasture every spring and autumn: for, where this is not practised, the weeds will ripen their seeds, which will spread over the ground, and thereby fill it with such a crop of weeds as will soon overbear the grass, and destroy it; and it will be very difficult to root them out after they have gotten such possession, especially ragwort, and such other weeds as have down adhering to their seeds.

The grass which is sown in these upland pastures seldom degenerate, if the land is tolerably good: whereas the low meadows, which are overflowed in winter, in a few years turn to an harsh rushy grass, though the upland will continue a fine sweet grass for many years without renewing.

There is no part of husbandry of which the farmers are in general more ignorant than that of the pasture: most of them suppose, that when old pasture is plowed up, it can never be brought to have a good sward again; so their common method of managing their land after ploughing, is to sow with their crop of barley some grass seeds as they call them; that is, either the red clover, which they intend to stand two years after the corn is taken off the ground, or rye-grass mixed with trefoil; but as all these are at most but biennial plants,

Pasture. whose roots decay soon after their seeds are perfected, so the ground, having no crop upon it, is again ploughed for corn; and this is the constant round which the lands are employed in by the better sort of farmers.

But whatever may have been the practice of these people, it is certainly possible to lay down lands which have been in tillage with grass, in such a manner as that the sward shall be as good, if not better, than any natural grass, and of as long duration. But this is never to be expected in the common method of sowing a crop of corn with the grass seeds; for, wherever this has been practised, if the corn has succeeded well, the grass has been very poor and weak; so that if the land has not been very good, the grass has scarcely been worth saving; for the following year it has produced but little hay, and the year after the crop is worth little, either to mow or feed. Nor can it be expected to be otherwise, for the ground cannot nourish two crops; and if there were no deficiency in the land, yet the corn, being the first and most vigorous of growth, will keep the grass from making any considerable progress; so that the plants will be extremely weak, and but very thin, many of them which come up in the spring being destroyed by the corn; for whenever there are roots of corn, it cannot be expected there should be any grass. Therefore the grass must be thin; and if the land is not in good heart to supply the grass with nourishment, that the roots may branch out after the corn is gone, there cannot be any considerable crop of clover; and as their roots are biennial, many of the strongest plants will perish soon after they are cut; and the weak plants, which had made but little progress before, will be the principal part of the crop for the succeeding year; which is many times not worth standing.

Therefore, when ground is laid down for grass, there should be no crop of any kind sown with the seeds; or at least the crop should be sown very thin, and the land should be well ploughed and cleaned from weeds, otherwise the weeds will come up the first, and grow so strong as to overbear the grass, and if they are not pulled up, will entirely spoil it. The best season to sow the grass seeds upon dry land, when no other crop is sown with them, is about the middle of September or sooner, if there is an appearance of rain: for the ground being then warm, if there happen some good showers of rain after the seed is sown, the grass will soon make its appearance, and get sufficient rooting in the ground before winter: so will not be in danger of having the roots turned out of the ground by frost, especially if the ground is well rolled before the frost comes on, which will press it down, and fix the earth close to the roots. Where this hath not been practised, the frost has often loosened the ground so much, as to let in the air to the roots of the grass, and done it great damage; and this has been brought as an objection to the autumnal sowing of grass; but it will be found to have no weight if the above direction is practised: nor is there any hazard of sowing the grass at this season, but that of dry weather after the seeds are sown; for if the grass comes up well, and the ground is well rolled in the end of October, or the beginning of November, and repeated again the beginning of March, the sward will be closely joined at bottom, and a good crop of hay may be expected

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Pasture. the same summer. But where the ground cannot be prepared for sowing at that season, it may be performed the middle or latter end of March, according to the season's being early or late; for, in backward springs, and in cold land, we have often sowed the grass in the middle of April with success; but there is danger, in sowing late, of dry weather, and especially if the land is light and dry; for we have seen many times the whole surface of the ground removed by strong winds at that season; so that the seeds have been driven in heaps to one side of the field. Therefore, whenever the seeds are sown late in the spring, it will be proper to roll the ground well soon after the seeds are sown, to settle the surface, and prevent its being removed.

The sorts of seeds which are the best for this purpose, are, the best sort of upland hay-seeds, taken from the cleanest pastures, where there are no bad weeds; if this seed is sifted to clean it from rubbish, three bushels will be sufficient to sow an acre of land. The other sort is the *trifolium pratense album*, which is commonly known by the names *white Dutch clover*, or *white honeysuckle grass*. Eight pounds of this seed will be enough for one acre of land. The grass seed should be sown first, and then the Dutch clover-seed may be afterwards sown; but they should not be mixed together, because the clover seeds being the heaviest will fall to the bottom, and consequently the ground will be unequally sown.

When the seeds are come up, if the land should produce many weeds, these should be drawn out before they grow so tall as to overbear the grass; for where this has been neglected, the weeds have taken such possession of the ground as to keep down the grass, and starve it; and when these weeds have been suffered to remain until they have shed their seeds, the land has been so plentifully stocked with them as entirely to destroy the grass; therefore it is one of the principal parts of husbandry never to suffer weeds to grow on the land.

If the ground is rolled two or three times at proper distances after the grass is up, it will press down the grass, and cause it to make a thicker bottom: for, as the Dutch clover will put out roots from every joint of the branches which are near the ground, so, by pressing down of the stalks, the roots will mat so closely together, as to form a sward so thick as to cover the whole surface of the ground, and form a green carpet, and will better resist the drought. For if we do but examine the common pastures in summer, in most of which there are patches of this white honeysuckle grass growing naturally, we shall find these patches to be the only verdure remaining in the fields. And this, the farmers in general acknowledge, is the sweetest feed for all sorts of cattle; yet never had any notion of propagating it by seeds, nor has this been long practised in England.

As the white clover is an abiding plant, so it is certainly the very best sort to sow, where pastures are laid down to remain; for as the hay-seeds which are taken from the best pastures will be composed of various sorts of grass, some of which may be but annual, and others biennial; so, when those go off, there will be many and large patches of ground left bare and naked, if there is not a sufficient quantity of the white

clover to spread over and cover the land. Therefore a good sward can never be expected where this is not sown; for in most of the natural pastures, we find this plant makes no small share of the sward; and it is equally good for wet and dry land, growing naturally upon gravel and clay in most parts of England: which is a plain indication how easily this plant may be cultivated to great advantage in most sorts of land throughout this kingdom.

Therefore the true cause why the land which has been in tillage is not brought to a good turf again, in the usual method of husbandry, is, from the farmers not distinguishing which grasses are annual from those which are perennial: for if annual or biennial grasses are sown, these will of course soon decay; so that, unless where some of their seeds may have ripened and fallen, nothing can be expected on the land but what will naturally come up. Therefore this, with the covetous method of laying down the ground with a crop of corn, has occasioned the general failure of increasing the pasture in many parts of Britain, where it is now much more valuable than any arable land.

After the ground has been sown in the manner before directed, and brought to a good sward, the way to preserve it good is, by constantly rolling the ground with an heavy roller, every spring and autumn, as hath been before directed. This piece of husbandry is rarely practised by farmers; but those who do, find their account in it, for it is of great benefit to the grass. Another thing should also be carefully performed, which is, to cut up docks, dandelion, knapweed, and all such bad weeds, by their roots every spring and autumn; this will increase the quantity of good grass, and preserve the pastures in beauty. Dressing of these pastures every third year is also a good piece of husbandry; for otherwise it cannot be expected the ground should continue to produce good crops. Besides this, it will be necessary to change the seasons of mowing, and not to mow the same ground every year, but to mow one season and feed the next; for where the ground is every year mown, it must be constantly dressed, as are most of the grass grounds near London, otherwise the ground will be soon exhausted.

PATÆCI, in mythology, images of gods which the Phœnicians carried on the prows of their galleys. Herodotus, lib. iv. calls them *παταίκοι*. The word is Phœnician, and derived from *pethica*, i. e. *titulus*. See Bocchart's Chanaan, lib. ii. cap. 3. But Scaliger does not agree. Morin derives it from *πῆμα*, *monkey*, this animal having been an object of worship among the Egyptians, and hence might have been honoured by their neighbours. Mr Ellner has observed, that Herodotus does not call the patæci gods; but that they obtained this dignity from the liberality of Hesychius and Suidas, and other ancient lexicographers, who place them at the stern of ships; whereas Herodotus placed them at the prow. Scaliger, Bochart, and Selden, have taken some pains about this subject.—Mr Morin has also given us a learned dissertation on this head in the *Memoires de l'Acad. des Inscript. & Belles Lettres*, tom. i.; but Mr Ellner thinks it defective in point of evidence.

PATAGONIA, a country of South America, comprehending all that country extending from Chili
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Patagonia.

Patagonia, and Paraguay to the utmost extremity of South America; that is, from 35° almost to 54° of latitude: being furrounded by the countries just mentioned, the South and North Seas, and the Straits of Magellan, which separate it from the island called *Terra del Fuego*, and extend about 116 leagues in length from sea to sea, but only from half a league to three or four in breadth.

This country had the name of *Terra Magellanica*, from Ferdinand Magellan, a Portuguese officer in the service of the Catholic king, who is reported to have sailed through the straits that also bear his name, from the North to the South Sea, in the year 1519.

The lofty mountains of the Andes, which are covered with snow a great part of the year, traversing the country from north to south, the air is said to be much colder than in the north under the same parallels of latitude. Towards the north, it is said to be covered with wood, and stored with an inexhaustible fund of large timber; whereas, to the southward, not so much as a single tree fit for any mechanical purpose is to be seen: yet there is good pasture, and incredible numbers of wild horned cattle and horses, which were first brought hither by the Spaniards, and have increased amazingly. Fresh water, we are told by some writers, is very scarce; but if that were really the case, it is difficult to conceive how the present inhabitants and such multitudes of cattle could subsist. The east coast is mostly low land, with few or no good harbours: one of the best is Port St Julian.

Patagonia is inhabited by a variety of Indian tribes; as the Patagons, from which the country takes its name; the Pampas, the Coflares, &c. of whom we know very little. Only it appears, from the accounts of former voyagers, lately confirmed by Commodore Byron and his crew, and the testimonies of other navigators, that some of them are of a gigantic stature, and clothed with skins; but it would seem that there are others who go almost quite naked, notwithstanding the inclemency of the climate. Some of them also, that live about the Straits, if we may credit the navigators who have passed that way into the South Sea, are perfect savages: but those with whom Commodore Byron and his people conversed, are represented as of a more gentle, humane disposition; only, like other savages, they live on fish and game, and what the earth produces spontaneously.

The Spaniards once built a fort upon the Straits, and left a garrison in it, to prevent any other European nation passing that way into the South Sea: but most of the men perished by famine, whence the place obtained the name of *Port Famine*; and no people have attempted to plant colonies here ever since.

About the middle of the Strait is a promontory called *Cape Froward*, which is the most southerly on the continent of South America.

On the coasts of Patagonia lie a great number of islands, or clusters of islands. On the west coasts are the islands *Maidre de Dios*, *Santa Trinidad*, *Santa Cruz*, the isles of the *Chunians* and *Huillans*, the *Sarmientos*, and many others; to the number of 80 in all, as some say. Of those on the south coast, the most considerable are *Terra del Fuego*, and *Staten Land*. See these articles.

A vast deal has been said respecting the stature of

the Patagonians, by people of different nations, and on various occasions. We shall insert the following letter from Mr Charles Clarke, who was on board Byron's ship in 1764, and gave this account to Dr Mat-
Patagonia ty.

"We had not got above 10 or 12 leagues into the straits of Magellan, from the Atlantic Ocean, before we saw several people, some on horseback, some on foot, upon the north shore (continent), and with the help of our glasses could perceive them beckoning to us to come on shore, and at the same time observed to each other, that they seemed to be of an extraordinary size: However, we continued to stand on, and should have passed without taking the least farther notice of them, could we have proceeded; but our breeze dying away, and the tide making against us, we were obliged to anchor; when the Commodore ordered his boat of 12 oars, and another of six, to be hoisted out, manned and armed. In the first went the Commodore, in the other Mr Cummins, our first lieutenant, and myself. At our first leaving the ship, their number did not exceed 40; but as we approached the shore, we perceived them pouring down from all quarters, some galloping, others running, all making use of their utmost expedition. They collected themselves into a body just at the place we steered off for. When we had got within 12 or 14 yards of the beach, we found it a disagreeable flat shore, with very large stones, which we apprehended would injure the boats; so looked at two or three different places to find the most convenient for landing. They supposed we deferred coming on shore through apprehensions of danger from them; upon which they all threw open the skins which were over their shoulders, which was the only clothing they had, and consequently the only thing they could secret any kind of arms with, and many of them lay down close to the water's edge.—The Commodore made a motion for them to go a little way from the water, that we might have room to land, which they immediately complied with, and withdrew 30 or 40 yards; we then landed, and formed each man with his musket, in case any violence should be offered. As soon as we were formed, the Commodore went from us to them, then at about 20 yards distance: they seemed vastly happy at his going among them, immediately gathered round him, and made a rude kind of noise, which I believe was their method of singing, as their countenances bespoke it a species of jollity. The Commodore then made a motion to them to sit down, which they did in a circle, with him in the middle, when Mr Byron took some beads and ribbons; which he had brought for that purpose, and tied about the womens necks, with which they seemed infinitely pleased. We were struck with the greatest astonishment at the sight of people of such a gigantic stature, notwithstanding our previous notice with glasses from the ship. Their body was increased, by the time we got in there, to the number of 500, men, women, and children. The men and women both rid in the same manner; the women had a kind of belt to close their skins round the waist, which the men had not, as theirs were only flung over their shoulders, and tied with two little slips, cut from the skin, round the neck. At the time of the Commodore's motion for them to retire farther up the beach, they all

Patagonia. all dismounted, and turned their horses loose, which were gentle, and stood very quietly. The Commodore having disposed of all his presents, and satisfied his curiosity, thought proper to retire; but they were vastly anxious to have him go up into the country to eat with them. That they wanted him to go with them to eat, we could very well understand by their motion, but their language was wholly unintelligible to us. — There was a very great smoke to which they pointed about a mile from us, where there must have been several fires; but some intervening hills prevented our seeing any thing but the smoke. The Commodore returned the compliment, by inviting them on board the ship; but they would not favour him with their company; so we embarked, and returned to the ship. We were with them near two hours at noon-day, within a very few yards, tho' none had the honour of shaking hands but Mr Byron and Mr Cummins; however, we were near enough, and long enough with them, to convince our senses, so far as not to be cavilled out of the very existence of those senses at that time, which some of our countrymen and friends would absolutely attempt to do. They are of a copper colour, with long black hair, and some of them are certainly nine feet, if they do not exceed it. The Commodore, who is very near six feet, could but just reach the top of one of their heads, which he attempted on tip-toes, and there were several taller than him, on whom the experiment was tried. They are prodigious stout, and as well and as proportionally made as ever I saw people in my life. That they have some kind of arms among them, is, I think, indisputable, from their taking methods to convince us they had none at that time about them. The women, I think, bear much the same proportion to the men as our Europeans do; there was hardly a man there less than eight feet, most of them considerably more. The women, I believe, run from seven and an half to eight feet. — Their horses were stout and bony, but not remarkably tall; they are, in my opinion, from 15 to 15½ hands. They had a great number of dogs, about the size of a middling pointer, with a fox nose. They continued on the beach till we got under way, which was two hours after we got on board. I believe they had some expectations of our returning again; but as soon as they saw us getting off, they betook themselves to the country.

"The country of Patagonia is rather hilly, though not remarkably so. You have here and there a ridge of hills, but no very high ones. We lay some time at Port Desire, which is not a great way to the northward of the Straits, where we traversed the country many miles round. We found fire-brands in different places, which convinced us there had been people, and we suppose them to have been the Patagonians. The soil is sandy, produces nothing but a coarse harsh grass, and a few small shrubs, of which Sir John Naborough remarked, he could not find one of size enough to make the helve of a hatchet; which observation we found very just. It was some time in the winter we made this visit to our gigantic friends. I am debarred being so particular as I could wish, from the loss of my journals, which were demanded by their Lordships of the Admiralty immediately upon our return."

Patagonia. That the whole of this account is true, we cannot assert; but that the writer has been misled in some respects, and misinformed with regard to some of his facts, is at least probable: for Captain Wallis, who went out to the Straits of Magellan after Byron's return, gives a different turn to many of the observations; and with respect to the stature of the people, he differs very materially. We shall give the following epitome of his remarks on what occurred to him — He had three ships with him, which entered the Straits on the 16th December 1766, and came to an anchor in a bay south of Cape Virgin Mary, where they were immediately accosted by a whole troop of Patagonians, who made signs for them to come on shore. The Captain, having made previous dispositions for the security of his men in case of an attack, manned all the boats belonging to the three ships, and with a party of marines landed on the beach where those giants had assembled. The commanders of the three ships, and most of their officers, were of this party. On their leaping ashore, the Indians seemed to welcome them; and being by signs desired to retreat, they all fell back, and made room for the marines to form. When they were drawn up, Captain Wallis advanced, and by signs directed the Indians to seat themselves in a semicircle, which they readily understood and obeyed. He then distributed among them knives, scissars, buttons, beads, combs, and particularly ribbons, with which he complimented the women, who received them with a mixture of pleasure and respect. He then gave them to understand that he had still more valuable articles to bestow, and showed them axes and bill-hooks; but, at the same time, pointed to some gauniques and ostriches, intimating that he expected some of those in return; but they either did not, or would not, understand him; so that no traffic took place.

The whole company that were assembled on this occasion, had each a horse, with a saddle and bridle. The saddle had a sort of stirrups, and the bridle was made of thongs of leather very well put together, for the purpose of guiding the horses. The women, as well as the men, rode astride. The men, in general, wore each a wooden spur; but one of them had a large pair of Spanish spurs, brass stirrups, and a Spanish scimitar. Their horses were nimble and spirited, but small in proportion to their riders, seemingly not above 14 hands high. Their dogs were of the Spanish breed. The Captain, having purposely provided himself with measuring rods, found that the tallest man among them measured only six feet seven inches high; several were within an inch or two as tall; but the ordinary size was from five feet ten inches to six feet. It is pity that none of our voyagers thought of measuring the whole size of one of those gigantic men. They tell us, indeed, that they are well made, that they are proportionally large, and that they are robust and bony; but they give us no criterion to judge of their bulk, nor one instance of their extraordinary strength. As they are represented not only peaceable, but remarkably tractable, some trials might have been made of the weight they could have lifted, and how much they could exceed in that respect the strongest man in the ships. This, in a great measure, would have determined the point, which is yet left doubtful by the different relations that are given by the different voyagers

Patagonia. who have seen these people, no two of them agreeing in the same description. All agree, however, that their hair is black, and harsh like bristles; that they are of a dark-copper colour, and that their features are rather handsome than ugly; that they clothe themselves decently with the skins of gaucicoes; that they paint themselves variously; and there is reason to suspect, that by that variety they distinguish their tribes. Those seen by Commodore Byron were painted round both eyes, no two of them alike; those seen by Captain Wallis had only a red circle round the left eye; and those seen by Bougainville had no circle round the eyes, but had their cheeks painted red. This may account for the different reports of voyagers concerning their stature: it is not impossible, nay, it is very probable, that they may vary in this particular, according to their tribes; as is seen in the Highlands of Scotland, where one clan of the Campbells is remarkably tall, and another of the Frasers remarkably short. Were it not for some such natural discrimination, there could not be so wide a difference in the descriptions of gentlemen, who, having no ends to serve either in falsifying one another's reports, or in imposing upon the public, cannot be supposed to mistake willfully.

One remarkable observation made by our voyagers must not be omitted; and that is, that though our people could distinguish but one word of their language, which the English pronounce *cheewow*, and the French *shawwa*, yet the Patagonians could repeat whole sentences after our men more distinctly than almost any European foreigner of what nation soever. This appears the more singular, as, among the islanders between the Tropics, it was hardly possible to make them articulate any of our words. Sydney Parkinson, in a specimen he has given us, says, that though the English remained at Otaheitee three months, the nearest the natives could approach the sound of *Cooke* was *Toote*; *Banks*, *Opane*; *Solander*, *Tolano*; *Gore*, *Towara*; *Monkhouse*, *Mata*; and so of the rest: whereas the Patagonians presently got by heart this sentence of invitation, *Come ashore, Englishmen!* which they showed they well understood, by repeating it afterwards whenever the ships came so near the shore as to be within call.

Another very remarkable particular is, that they had none of the characters of a ferocious people; there was no offensive weapon among them, except the scimitar already mentioned. The men, indeed, had a kind of sling, which they use in hunting, consisting of two round stones of about a pound weight each, connected together by a thong. These stones were fastened to the extremities of the thong; and, when they threw them, they held one stone in the hand, and swung the other about the head. "They are so expert in the management of this double-headed shot (says the writer of the voyage), that they will hit a mark not bigger than a shilling with both these stones at the distance of fifteen yards; but their method of availing themselves of their dexterity against the gaucicoe and ostrich is, to sling the stones so as to entangle their legs, by which means they are retarded in their flight, and easily overtaken. Bougainville speaks of these slings as common among other Indian nations in South America; but we do not remember to have seen this assertion confirmed by any other voyager.

These people certainly dress differently as well as paint differently; for the dress described by Bougainville is very unlike the dress of those seen by the English voyagers. Captain Wallis invited some of them on board his ship: but, among all the wonders that were shown them, none seemed to attract their notice so much as the looking-glasses: they looked in the glasses and at each other; they laughed and gazed, and gazed again and laughed; in short, there was no end to their merriment when in possession of this article of curiosity. They eat whatever was given them, but would drink nothing but water. In this they differ from all the tribes of Indians in North America, who are immoderately fond of spirituous liquors. They admired the European sheep, hogs, and poultry; but did not seem over-desirous of any thing they saw except clothes. When the marines were exercised to entertain them, they appeared disconcerted; an old man among them made signs, by striking his breast, and tumbling down and lying as if he had been dead upon deck, that he knew the effect of their guns; and none of them seemed easy till the firing was over. When the Captain had satisfied his own curiosity, and, as he imagined, theirs, he gave them to understand, that he was going to sail, and that they must depart; which they were very unwilling to do. However, having given each of them a canvas bag, with some needles ready threaded, a knife, a pair of scissars, a few beads, a comb, and a looking-glass, he dismissed them, with great reluctance on their part, particularly on that of the old man's, who by very significant signs expressed his desire to stay till sunset.

PATAGONULA, in botany; a genus of the monogynia order, and of the pentandria class of plants. The characters are these: the cup is an extremely small perianthium, divided into five segments, and remains after the flower is fallen; the flower consists of a single petal, with almost no tube, the margin of which is divided into five acute oval segments; the stamina are five filaments of the length of the flower; the antheræ simple; the germen of the pistil is oval and pointed; the style is slender and slightly bifid, its ramifications are also bifid; this is of the same length with the stamina, and remains when the flower is fallen; the stigmata are simple; the fruit is an oval and pointed capsule, standing on a large cup, made up of five long segments emarginated or rimmed round their edges; the seeds of this plant are yet unknown; but the construction of the cup, in which the capsule stands, is alone a sufficient distinction for this genus. There is but a single species.

PATAN, a kingdom of Asia, in the East Indies, and in the peninsula of Malacca, and on the eastern coast between the kingdoms of Siam and Paha. The inhabitants are partly Mahometans and partly Gentoos; but they are all very voluptuous. The air is wholesome, though very hot; and they have no seasons but the winter and summer. The former is more properly the rainy season; and contains the months of November, December, and January. The woods are full of elephants and many wild animals. Some voyagers pretend that this country is governed by a queen, who never marries, but may have as many gallants as she pleases. They have some trade with the Chinese; and the principal town is of the same name, which is one of

Patagonia
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Patan.

Patan of the strongest in these parts, having a well defended harbour.

Patella.

PATAN, a town of Asia, and capital of a province of the same name, in the dominions of the Great Mogul; it is very little known. E. Long. 109. 0. N. Lat. 27. 30.

PATAVINITY, among critics, denotes a peculiarity of Livy's diction; derived from Patavium or Padua, the place of his nativity; but wherein this patavinity consists, they are by no means agreed.

Asinius Pollio, according to Quintilian, taxed Livy with patavinity. But what he meant by this censure we believe no man can say. Morhof believes it to be a singular turn of expression, and some phrases peculiar to the Paduese. All we certainly know about it is, that it was a fault in the language of Livy, not in the sentiments or manners. In all probability, it is one of those delicacies that are lost in a dead language. Dan. Georg. Morhof published a treatise *De Patavinitate Liviana*, at Kiel, in 1685, where he explains, very learnedly, the urbanity and peregrinity of the Latin tongue.

PATARA, (Livy; Mela); the capital of Lycia, to the east of the mouth of the river Xanthus; famous for a temple and oracle of Apollo, thence called *Patareus*, three syllables only; but *Patareus*, (Horace). For the six winter months, Apollo gave answers at Patara; and for the six summer at Delos, (Virgil, Servius): these are the *Lycia Sortes* of Virgil. The town was situated in a peninsula, called *Liciorum Chersonesus*, (Stephanus). Acts xxi. 1. St Paul in his passage from Philippi to Jerusalem, came to Miletus, hence to Coos, then to Rhodes, and from Rhodes to Patara; where having found a ship that was bound for Phœnicia, he went on board and arrived at Jerusalem, to be at the feast of Pentecost.

PATAVIUM (Tacitus, Strabo), a town of the Transpadana, situated on the left or north bank of the Medoacus Minor; founded by Antenor the Trojan, (Mela, Virgil, Seneca); *Patavini*, the people, (Livy); who himself was a native, and by Asinius Pollio charged with pativinity. Now *Padua*, in the territory and to the west of Venice. E. Long. 12. 15. N. Lat. 45. 30.

PATAY, a town of France, in the province of Orleans, remarkable for the defeat of the English in 1429, and where Joan of Arc did wonders. E. Long. 1. 43. N. Lat. 48. 5.

PATE, in fortification, a kind of platform, resembling what is called an *horse's shoe*.

PATEE, or **PATTEE**, in heraldry, a cross, small in the centre, and widening to the extremities, which are very broad.

PATELLA, or **KNEE-PAN**, in anatomy. See there, n° 59.

PATELLA, or **LIMPET**, a genus of insects belonging to the order of vermes testacea; the animal being of the snail kind. The shells are of that class which is called *univalves*; they have no contour, and are in the form of little pointed cones. They are always attached to some hard body. Their summit is sometimes acute, sometimes obtuse, flattened, turned back, or perforated. The rock or other hard body to which they are always found adhering, serves as a kind of second or under shell to preserve them from injury; and for this reason Aldrovandus and Rondelet have classed them among the bivalves; but in this error they have not been followed by any other writer. Fabius

Columna distinguishes four sorts of the *lepas* or limpets: *lepas vulgaris*, a sort very common at Naples, of an oval figure and ash-colour. *Lepas major exotica*, which comes from Spain, the shell is hard, thick, and ribbed in angles, and the rim is denticulated. The *lepas agrea*, or *sylvestris*, which is a small shell, irregularly oval, of an ash colour, marked with radii and zones crossing each other, and perforated at the top by an aperture which serves the fish for a vent. And the *patella regalis*, *quia regis mensa sit digna*; this is of a mother-of-pearl colour within, and is ribbed and perforated in many places: these shells have been found on the back of the sea-tortoise, or turtle, and on a large pinna marina. The distinguishing mark or characteristic of the *lepas* is to have but one convex shell, which adheres by its rim to a rock, or some other hard substance. There are 36 species of this genus, which are principally distinguished by peculiarities in their shells. Of some of these shells we have given engravings in Plate CCCLXXXII. of which we add the following description:

The limpet marked 1. has large yellow furrows and ridges from the centre to the circumference, which is indented; the eye is perfectly white, and shaped like a nipple.

That marked 2. is perfectly smooth, but radiated with brown streaks, and perforated in the summit.

Fig. 3. is ribbed, and indented at the circumference; its coat is spotted with brown, in a zig-zag form, and its eye is of a ruby colour.

Fig. 4. is a small brown shell, the ribs or striae of which are armed with small white points.

Fig. 5. is striated with radii, reaching from the eye to the circumference, which are crossed by other streaks nearly parallel to the circumference; it is of the usual colour, and its eye is perforated.

Fig. 6. This is white, shaped something like an hand-bell, and has within a protuberance somewhat resembling a clapper.

Fig. 7. is a seven-sided limpet, divided at each angle by ridges from the summit, which form a star on a white ground, variegated with black spots.

Fig. 8. is a small ribbed shell, of a brown colour, and rough; it has a chamber, and a beak-fashioned eye placed at one of its extremities.

Fig. 9. is the finest shell of this species: its size, the fine mother-of-pearl colour on the inside, and the beauty of its red spots without, which have the appearance of tortoise-shell, give it the pre-eminence over all others. It is called the *Tortoise shell buckler*.

The wild limpet, or *patella fera*, is a name very improperly applied by Rondilutius and Aldrovand to the *aures marinae*, or *concha veneris*, which certainly is not of the patella kind.

PATELLA, in the History of Insects, a name given by Lister and other authors to a little husk or shell, found on the bark of the cherry, plum, rose, and other trees, containing an animal within, and useful in colouring. These patellæ are of the form of globes, except when they adhere to the tree, and are for the most part of a shining chestnut colour. The husk itself strikes a very fine crimson colour on paper, and within it is found a white maggot which is of no value: this, in time, hatches into a very small but beautiful bee. The size of this bee is about half that of an

Patella.

ant.

Patella
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Patera.

ant. They have a sting like bees, and three spots placed in a triangle on the forehead, which are supposed to be eyes. They are of a black colour, and have a large round whitish or pale yellow spot on the back. The upper pair of wings are shaded and spotted, but the under pair are clear. It might be worth while to try the shells or husks in order to discover whether the colour they yield might not be useful. It is to be remarked, that the deepest coloured husks afford the finest and deepest purple: they must be used while the animal in them is in the maggot form; for when it is changed into the bee state the shell is dry and colourless. Lister, who first observed these patellæ, went so far on comparing them with the common kermes, as to assert that they were of the same nature with that production: but his account of their being the workmanship of a bee, to preserve her young maggot in, is not agreeable to the true history of the kermes; for that is an insect of a very peculiar kind. He has in other instances been too justly censured for his precipitancy of judging of things, and perhaps has fallen into an error by means of it here. It is very possible that these patellæ may be the same sort of animals with the kermes, but then it produces its young within this shell or husk, which is no other than the skin of the body of the mother animal; but as there are many flies whose worms or maggots are lodged in the bodies of other animals, it may be that this little bee may love to lay its egg in the body of the proper insect, and the maggot hatched from that egg may eat up the proper progeny, and, undergoing its own natural changes there, issue out at length in form of the bee. This may have been the case in some few which Dr Lister examined; and he may have been misled by this to suppose it the natural change of the insect.

PATENT, in general, denotes something that stands open or expanded: thus a leaf is said to be patent, when it stands almost at right angles with the stalk.

PATENT, or *Letters Patent*. See LETTER.

PATER NOSTER, the *Lord's Prayer*, so called from the two first words thereof in Latin.

PATER Noster, islands of Asia, in the East Indian sea, so called because of the great number of rocks, which sailors have likened to the beads with which the Papists tell their pater-noster. They abound in corn and fruits, and are very populous.

PATER Patratus, was the name of the first and principal person the college of heralds called *Feciales*. Some say the Pater Patratus was a constant officer and perpetual chief of that body; and others suppose him to have been a temporary minister, elected upon account of making peace or denouncing war, which were both done by him. See FECIALES.

PATERA, among antiquaries, a goblet or vessel used by the Romans in their sacrifices; wherein they offered their consecrated meats to the gods, and where-with they made libations. See SACRIFICE and LIBATION.

The word is Latin, formed from *pateo*, "I am open;" *quod patet*, "because it has a great aperture;" in contradistinction to bottles, &c. which have only narrow necks, or whose aperture is less than the body of the vessel.

On medals the patera is seen in the hands of several

deities; and frequently in the hands of princes, to mark the sacerdotal authority joined with the imperial, &c.

Hence F. Joubert observes, that beside the patera, there is frequently an altar upon which the patera seems to be pouring its contents.

The patera was of gold, silver, marble, brass, glass, or earth; and they used to inclose it in urns with the ashes of the deceased, after it had served for the libations of the wine and liquors at the funeral.

The patera is an ornament in architecture, frequently seen in the Doric freeze, and the tympana of arches; and they are sometimes used by themselves, to ornament a space; and in this case it is common to hang a string of husks or drapery over them: sometimes they are much enriched with foliage, and have a mask or a head in the centre.

PATERCULUS (Caius Velleius), an ancient Roman historian, who flourished in the reign of Tiberius Cæsar, was born in the year of Rome 735. His ancestors were illustrious for their merit and their offices. His grandfather espoused the party of Tiberius Nero, the emperor's father; but being old and infirm, and not able to accompany Nero when he retired from Naples, he ran himself through with his sword. His father was a soldier of rank, and so was Paterculus himself. He was a military tribune when Caius Cæsar, a grandson of Augustus, had an interview with the king of the Parthians, in an island of the river Euphrates, in the year 753. He commanded the cavalry in Germany under Tiberius; and accompanied that prince for nine years successively in all his expeditions. He received honourable rewards from him; but we do not find that he was preferred to any higher dignity than the prætorship. The praises he bestows upon Sejanus give some probability to the conjecture, that he was looked upon as a friend of this favourite, and consequently that he was involved in his ruin. His death is placed by Mr Dodwell in the year of Rome 784, when he was in his 50th year.

He wrote an Abridgement of the Roman History in two books, which is very curious. His purpose was only to deduce things from the foundation of Rome to the time wherein he lived; but he began his work with things previous to that memorable era: for, though the beginning of his first book is wanting, we yet find in what remains of it, an account of many cities more ancient than Rome. He promised a larger history; and no doubt would have executed it well: for during his military expeditions he had seen, as he tells us, the provinces of Thrace, Macedonia, Achaia, Asia Minor, and other more easterly regions; especially upon the shores of the Euxine sea, which had furnished his mind with much entertaining and useful knowledge. In the Abridgement which we have, many particulars are related that are nowhere else to be found; and this makes it the more valuable. The style of Paterculus, though miserably disguised through the carelessness of transcribers, and impossible to be restored to purity for want of manuscripts, is yet manifestly worthy of his age, which was the time of pure Latinity. The greatest excellence of this historian lies in his manner of commending and blaming those he speaks of; which he does in the finest terms and most delicate expressions. He is, however, condemned, and indeed with the greatest

Paterculus greatest reason, for his partiality to the house of Augustus; and for making the most extravagant eulogies, not only upon Tiberius, but even upon his favourite Sejanus: whom, though a vile and cruel monster, Paterculus celebrates as one of the most excellent persons the Roman commonwealth had produced. Lipsius, though he praises him in other respects, yet censures him most severely for his insincerity and partiality. "Velleius Paterculus (says he) raises my indignation: he represents Sejanus as endowed with all good qualities. The impudence of this historian! But we know that he was born, and died, to the destruction of mankind. After many commendations, he concludes, that Livia was a woman more resembling the gods than men: and as to Tiberius, he thinks it a crime to speak otherwise of him than as of an immortal Jove. What sincere and honest mind can bear this? On the other hand, how artfully does he everywhere conceal the great qualities of Cæsar Germanicus! how obliquely does he ruin the reputation of Agrippina and others, whom Tiberius was thought to hate! In short, he is nothing but a court-prostitute. You will say, perhaps, it was unsafe to speak the truth at those times: I grant it; but if he could not write the truth, he ought not to have written lies: none are called to account for silence." La Mothe le Vayer has made a very just remark upon this occasion: "The same fault (says he) may be observed in many others, who have written the history of their own times, with a design to be published while they lived."

It is strange, that a work so elegant and worthy to be preserved, and of which, by reason of its shortness, copies might be so easily taken, should have been so near being lost. One manuscript only has had the luck to be found, as well of this author among the Latins as of Hesychius among the Greeks: in which, says a great critic of our own nation, "The faults of the scribes are found so numerous, and the defects so beyond all redress, that notwithstanding the pains of the learned and most acute critics for two whole centuries, these books still are, and are like to continue, a mere heap of errors." No ancient author but Priscian makes mention of Paterculus: the moderns have done him infinitely more justice, and have illustrated him with notes and commentaries. He was first published, from the manuscript of Morbac, by Rhenanus, at Basil in 1520: afterwards by Lipsius at Leyden in 1581; then by Gerard Vossius in 1639; next by Boeclerus at Strasburg in 1642; then by Thyfius and others; and, lastly, by Peter Burman at Leyden, 1719, in 8vo. To the Oxford edition in 1693, 8vo, were prefixed the *Annales Velleiani* of Mr Dodwell, which show deep learning and a great knowledge of antiquity.

PATH, in general, denotes the course or track marked out or run over by a body in motion.

For the path of the moon, &c. see **ASTRONOMY**, n^o 359, 360.

PATHETIC, whatever relates to the passions, or that is proper to excite or awake them. The word comes from the Greek *πάθος*, passion or emotion. See **PASSION**.

PATHETIC, in music, something very moving, expressive, or passionate; capable of exciting pity, compassion, anger, or other passions. Thus we speak of the pathetic style, a pathetic figure, pathetic song, &c.

The chromatic genus, with its greater and lesser semitones, either ascending or descending, is very proper for the pathetic; as is also an artful management of discords; with a variety of motions, now brisk, now languishing, now swift, now slow.

Nieuwentyt speaks of a musician at Venice who so excelled in the pathetic, that he was able to play any of his auditors into distraction: he says also, that the great means he made use of was the variety of motions, &c.

PATHOGNOMONIC, among physicians, an appellation for a symptom, or concurrence of symptoms, that are inseparable from a distemper, and are found in that only, and in no other.

PATHOLOGY, that part of medicine which explains the nature of diseases, their causes and symptoms. See **MEDICINE**.

PATHOS, a Greek term, literally signifying passion.

PATHROS, a city and canton of Egypt, of which the prophets Jeremiah and Ezekiel make mention; Jerem. xlv. 1. 15. Ezek. xxix. 14. xxx. 14. We do not very well know its situation, though Pliny and Ptolemy the geographer speak of it by the name of Phaturis; and it appears to have been in Upper Egypt. Isaiah (xii. 2.) calls it Pathros; and it is the country of the Pathrusim, the posterity of Mizraim, of whom Moses speaks, Gen. x. 14. Ezekiel threatens them with an entire ruin. The Jews retired thither notwithstanding the remonstrances of Jeremiah; and the Lord says, by Isaiah, that he will bring them back from thence.

PATIENCE, that calm and unruffled temper with which a good man bears the evils of life, from a conviction that they are at least permitted, if not sent, by the best of Beings, who makes all things work together for good to those who love and fear him.

The evils by which life is embittered may be reduced to these four: 1. Natural evils, or those to which we are by nature subject as men, and as perishable animals. The greatest of these are, the death of those whom we love, and of ourselves. 2. Those from which we might be exempted by a virtuous and prudent conduct, but which are the inseparable consequences of imprudence or vice, which we shall call punishments; as infamy proceeding from fraud, poverty from prodigality, debility and disease from intemperance. 3. Those by which the fortitude of the good are exercised; such as the persecutions raised against them by the wicked. To these may be added, 4. The opposition against which we must perpetually struggle, arising from the diversity of sentiments, manners, and characters of the persons among whom we live.

Under all these evils patience is not only necessary but useful: it is necessary, because the laws of nature have made it a duty, and to murmur against natural events is to affront providence; it is useful, because it renders our sufferings lighter, shorter, and less dangerous.

Is your reputation sullied by invidious calumnies? rejoice that your character cannot suffer but by false imputations. You are arraigned in a court of judicature, and are unjustly condemned: passion has influenced both your prosecutor and your judge, and you cannot forbear repining that you suffer although innocent.

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Patience.

Patience.

nocent. But would it have been better that you should have suffered being guilty? Would the greatest misfortune that can befall a virtuous man be to you a consolation? The opulence of a villain, the elevated station to which he is raised, and the honours that are paid to him, excite your jealousy, and fill your bosom with repinings and regret. What! say you, are riches, dignity, and power, reserved for such wretches as this? Cease these groundless murmurs. If the possessions you regret were real benefits, they would be taken from the wicked and transferred to you. What would you say of a successful hero, who, having delivered his country, should complain that his services were ill requited, because a few sugar-plums were distributed to some children in his presence, of which they had not offered him a share? Ridiculous as this would appear, your complaints are no better founded. Has the Lord of all no reward to confer on you but perishable riches and empty precarious honour?

It is fancy, not the reason of things, that makes life so uneasy to us. It is not the place nor the condition, but the mind alone, that can make any body happy or miserable.

He that values himself upon conscience, not opinion, never heeds reproaches. When we are evil spoken of, if we have not deserved it, we are never the worse; if we have, we should mend.

Tiberius the Roman emperor, at the beginning of his reign, acted in most things like a truly generous, good natured, and clement prince. All slanderous reports, libels, and lampoons upon him and his administration, he bore with extraordinary patience; saying, "That in a free state the thoughts and tongues of every man ought to be free:" and when the senate would have proceeded against some who had published libels against him, he would not consent to it; saying, "We have not time enough to attend to such trifles: if you once open a door to such informations, you will be able to do nothing else; for under that pretence every man will revenge himself upon his enemies by accusing them to you." Being informed that one had spoken detractingly of him: "If he speaks ill of me," says he, "I will give him as good an account of my words and actions as I can; and if that is not sufficient, I will satisfy myself with having as bad an opinion of him as he has of me." Thus far even Tiberius may be an example to others.

Men will have the same veneration for a person that suffers adversity without dejection, as for demolished temples, the very ruins whereof are revered and adored.

A virtuous and well-disposed person, is like to good metal; the more he is fired, the more he is refined; the more he is opposed, the more he is approved: wrongs may well try him and touch him, but cannot imprint in him any false stamp.

The man therefore who possesses this virtue (patience), in this ample sense of it, stands upon an eminence, and sees human things below him: the tempest indeed may reach him; but he stands secure and collected against it upon the basis of conscious virtue, which the severest storms can seldom shake, and never overthrow.

Patience, however, is by no means incompatible with sensibility, which, with all its inconveniences, is to be cherished by those who understand and wish to

maintain the dignity of their nature. To feel for others, disposes us to exercise the amiable virtue of charity, which our religion indispensably requires. It constitutes that enlarged benevolence which philosophy inculcates, and which is indeed comprehended in Christian charity. It is the privilege and the ornament of man; and the pain which it causes is abundantly recompensed by that sweet sensation which ever accompanies the exercise of beneficence.

To feel our own misery with full force is not to be deprecated. Affliction softens and improves the heart. Tears, to speak in the style of figure, fertilize the soil in which the virtues grow. And it is the remark of one who understood human nature, that the faculties of the mind, as well as the feelings of the heart, are meliorated by adversity.

But in order to promote these ends, our sufferings must not be permitted to overwhelm us. We must oppose them with the arms of reason and religion; and to express the idea in the language of the philosopher, as well as the poet, of Nature, every one, while he is compelled to feel his misfortunes like a man, should resolve also to bear them like a man.

Resign'd in ev'ry state,

With patience bear, with prudence push, your fate;
By suffering well our fortune we subdue,
Fly when she frowns, and when she calls pursue.

PATIGUMO (a corruption of the words *pate-de-guimauve*); the name of a sort of paste or cakes much used on the continent as an agreeable and useful remedy for catarrhal defluxions, and supposed by Dr Percival to consist of gum-arabic combined with sugar and the whites of eggs (see the article HUNGER, p. 715, col. 1.) But we have been informed that the powdered substance of the marshmallow is the chief ingredient of the composition.

PATIN (Guy), professor of physic in the royal college of Paris, was born in 1602. He made his way into the world merely by the force of his genius, being at first corrector of a printing-house. He was a man of great wit and erudition: he spoke with the gravity of a Stoic, but his expressions were very satirical. He hated bigotry, superstition, and knavery; had an upright soul, and a well-disposed heart. He was a most tender father, courteous to every body, and polite in the highest degree. He died in 1672, and did not owe his reputation to any writings published in his lifetime upon physic; but his letters which appeared after his death have rendered his name very famous. He left a son mentioned in the ensuing article.

PATIN (Charles), who made a great figure in the world, and excelled in the knowledge of medals. He was born in Paris in 1633; and made so surprising a progress, that he maintained theses in Greek and Latin, on all parts of philosophy, in 1647. He studied the law in compliance to an uncle, and was admitted an advocate in the parliament of Paris; but could not lay aside that of physic, for which he always had an inclination. He therefore quitted the law, and devoted himself to physic; in which, after taking the doctor's degree, he applied himself to practice with great success. He afterwards travelled into Germany, Holland, England, Switzerland, and Italy. In 1676 he was appointed

Patience
Patin.

Patkul. appointed professor of physic in Padua; and three years after was created a knight of St Mark. He died in that city in 1694. His works are many, and well known to the learned world. His wife too, and his daughters, were authoresses.

PATKUL (John Reinhold), was born of a noble family in Livonia, a northern province belonging to the crown of Sweden. The Livonians having been stripped of their privileges, and great part of their estates, by Charles XI. Patkul was deputed to make their complaint; which he did with such eloquence and courage, that the king, laying his hand upon his shoulder, said, 'You have spoken for your country as a brave man should, and I esteem you for it.'

Charles, however, who added the baseness of hypocrisy to the ferocity of a tyrant, was determined to punish the zeal and honesty which he thought fit to commend; and a few days afterwards caused Patkul to be declared guilty of high treason, and condemned to die. Patkul, however, found means to escape into Poland, where he continued till Charles was dead. He hoped that his sentence would have been then reversed, as it had been declared unjust even by the tyrant that procured it: but being disappointed in this expectation, he applied to Augustus king of Poland, and solicited him to attempt the conquest of Livonia from the Swedes; which, he said, might be easily effected, as the people were ready to shake off their yoke, and the king of Sweden was a child incapable of compelling their subjection.

Augustus possessed himself of Livonia in consequence of this proposal; and afterwards, when Charles XII. entered the province to recover it, Patkul commanded in the Saxon army against him. Charles was victorious; and Patkul, some time afterwards, being disgusted at the haughty behaviour of General Fleming, Augustus's favourite, entered into the service of the Czar, with whom Augustus was in strict alliance, and a little before Charles compelled Augustus to abdicate the throne of Poland, and his subjects to elect Stanislaus in his stead. The Czar sent Patkul, with the title of his ambassador, into Saxony, to prevail with Augustus to meet him at Grodno, that they might confer on the state of their affairs. This conference took place; and immediately afterwards the Czar went from Grodno to quell a rebellion in Astracan. As soon as the Czar was gone, Augustus, to the surprise of all Europe, ordered Patkul, who was then at Dresden, to be seized as a state criminal. By this injurious and unprecedented action, Augustus at once violated the law of nations, and weakened his own interest; for Patkul was not only an ambassador, but an ambassador from the only power that could afford him protection. The cause, however, was this: Patkul had discovered that Augustus's ministers were to propose a peace to Charles upon any terms; and had therefore formed a design to be beforehand with them, and procure a separate peace between Charles and his new master the Czar. The design of Patkul was discovered; and, to prevent its success, Augustus ventured to seize his person, assuring the Czar that he was a traitor, and had betrayed them both.

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Augustus was soon after reduced to beg a peace of Charles at any rate; and Charles granted it upon certain conditions, one of which was, that he should deliver up Patkul. This condition reduced Augustus to a very distressful dilemma: the Czar, at this very time, reclaimed Patkul as his ambassador; and Charles demanded, with threats, that he should be put into his hands. Augustus therefore contrived an expedient by which he hoped to satisfy both: he sent some guards to deliver Patkul, who was prisoner in the castle of Konigstein, to the Swedish troops; but by secret orders, privately dispatched, he commanded the governor to let him escape. The governor, though he received this order in time, yet disappointed its intention by his villainy and his avarice. He knew Patkul to be very rich; and having it now in his power to suffer him to escape with impunity, he demanded of Patkul a large sum for the favour: Patkul refused to buy that liberty which he made no doubt would be gratuitously restored, in consequence of the Czar's requisition and remonstrance; and, in the mean time, the Swedish guards arrived with the order for his being delivered up to them. By this party he was first carried to Charles's head quarters at Albranstadt, where he continued three months, bound to a stake with a heavy chain of iron. He was then conducted to Casimir, where Charles ordered him to be tried; and he was by his judges found guilty. His sentence depended upon the king; and after having been kept a prisoner some months, under a guard of Mayerfeldt's regiment, uncertain of his fate, he was, on the 8th of September 1707, towards the evening, delivered into the custody of a regiment of dragoons, commanded by Colonel Nicholas Hielm. On the next day, the 29th, the colonel took the chaplain of his regiment aside, and telling him that Patkul was to die the next day, ordered him to acquaint him with his fate, and prepare him for it. About this very time he was to have been married to a Saxon lady of great quality, virtue, and beauty; a circumstance which renders his case still more affecting. What followed in consequence of the colonel's order to the minister (A) will be related in his own words.

"Immediately after evening service I went to his prison, where I found him lying on his bed. The first compliments over, I entered upon the melancholy duty of my profession, and turning to the officer who had him in charge, told him the colonel's orders were, that I should be alone with his prisoner. The officer having withdrawn, Patkul grasping both my hands in his, cried out with most affecting anxiety and distress, My dear pastor! what are you to declare? what am I to hear? I bring you, replied I, the same tidings that the prophet brought to king Hezekiah, *Set thine house in order, for thou must die.* To morrow by this time thou shalt be no longer in the number of the living! At this terrible warning he bowed himself upon his bed, and burst into tears. I attempted to comfort him, by saying that he must, without all doubt, have often meditated on this subject: Yes, cried he, I know, alas! too well, that we must all die; but the death prepared for me will be cruel and insupportable. I assured him that the manner of his death

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death

(A) The name of this clergyman was Lorens Hagar.

Patkul,

death was to me totally unknown; but, believing that he would be prepared for it, I was sure his soul would be received into the number of happy spirits. Here he rose up, and folding his hands together, Merciful Jesus! let me then die the death of the righteous! A little after, with his face inclined to the wall, where stood his bed, he broke out into this soliloquy: Augustus! O Augustus, what must be thy lot one day! Must thou not answer for all the crimes thou hast committed? He then observed that he was driven out from his country, by a sentence against his life, pronounced for doing what the king himself encouraged him to do, saying to him one day in terms of much kindness, 'Patkul, maintain the rights of your country like a man of honour, and with all the spirit you are capable of.' That flying into an enemy's country was also unavoidable, as the country of an ally would not have afforded him protection; but that he was in Saxony a wretched exile, not a counsellor or adviser; that before his arrival every thing was already planned, the alliance with Muscovy signed, and the measures with Denmark agreed upon. 'My inclination (said he, after a pause) were always to serve Sweden, though the contrary opinion has prevailed. The elector of Brandenburg owed his title of *king of Prussia* to the services I did him; and when, in recompense, he would have given me a considerable sum of money, I thanked him, and rejected the offer; adding, that the reward I most wished for was to regain the king of Sweden's favour by his intercession. This he promised, and tried every possible method to succeed, but without success. After this I laboured so much for the interest of the late emperor in his Spanish affairs, that I brought about what scarce any other man could have effected. The emperor as an acknowledgment gave me an assignment for 50,000 crowns, which I humbly laid at his feet, and only implored his imperial majesty's recommendation of me to my king's favour: this request he immediately granted, and gave his orders accordingly, but in vain. Yet, not to lose any opportunity, I went to Moscow while the Swedish ambassadors were at that court; but even the mediation of the Czar had no effect. After that I distributed among the Swedish prisoners at Moscow at least 100,000 crowns, to show the ardent desire I had, by all ways, to regain the favour of their sovereign. Would to heaven I had been equally in earnest to obtain the grace of God.'—At these words another shower of tears fell from his eyes, and he remained for some moments silent, and overwhelmed with grief. I used my best endeavours to comfort him with the assurance that this grace would not be denied him, provided he spent the few hours still left in earnestly imploring it; for the door of heaven's mercy was never shut, though that of men might be cruelly so. 'This (replied he), this is my consolation; for thou art God and not man to be angry for ever.' He then inveighed bitterly against Augustus, and reproached himself for having any connection with a wretch who was wholly destitute of all faith and honour, an atheist, without piety, and without virtue. 'While he was at Warsaw (said he), and heard the king was advancing to attack him, he found himself extremely distressed. He was absolutely without money, and therefore obliged to dismiss some of his troops. He had recourse to my

assistance, and intreated me, for the love of God, to borrow whatever sum I could. I procured him 400,000 crowns; 50,000 of which, the very next day, he squandered on trinkets and jewels, which he gave in presents to some of his women. I told him plainly my thoughts of the matter; and by my importunity prevailed, that the Jews should take back their toys, and return the money they had been paid for them. The ladies were enraged; and he swore that I should one time or other suffer for what I had done: there indeed he kept his word; would to God he had always done so with those he employed! I now left him for a short time, and at seven in the evening I returned; and the officer being retired, he accosted me with a smiling air, and an appearance of much tranquillity, 'Welcome, dear sir, the weight that lay heavy on my heart is removed, and I already feel a sensible change wrought in my mind. I am ready to die: death is more eligible than the solitude of a long imprisonment. Would to heaven only that the kind of it were less cruel. Can you, my dear sir, inform me in what manner I am to suffer? I answered, that it had not been communicated to me; but that I imagined it would pass over without noise, as only the colonel and myself had notice of it. 'That (replied he) I esteem as a favour; but have you seen the sentence? or must I die, without being either heard or condemned? My apprehensions are of being put to intolerable tortures.' I comforted him in the kindest manner I could; but he was his own best comforter from the Word of God, with which he was particularly acquainted; quoting, among many other passages, the following in Greek, *We must enter into the kingdom of heaven through many tribulations*. He then called for pen and ink, and intreated me to write down what he should dictate. I did so, as follows:

'*Testamentum, or my last will as to the disposition of my effects after my death.*—I. His majesty King Augustus, having first examined his conscience thoroughly, will be so just as to pay back to my relations the sum he owes me; which, being liquidated, will amount to 50,000 crowns; and as my relations are here in the service of Sweden, that monarch will probably obtain it for them.'

"At this he said, let us stop here a little; I will quickly return to finish this will; but now let us address ourselves to God by prayer. Prayers being ended, 'Now (cried he) I find myself yet better, yet in a quieter frame of mind: Oh! were my death less dreadful, with what pleasure would I expiate my guilt by embracing it!—Yes (cried he, after a pause), I have friends in different places, who will weep over my deplorable fate. What will the mother of the king of Prussia say? What will be the grief of the Countess Levolve who attends on her? But what thoughts must arise in the bosom of *her* to whom my faith is plighted? Unhappy woman! the news of my death will be fatal to her peace of mind. My dear pastor, may I venture to beg one favour of you?' I assured him he might command every service in my power. 'Have the goodness then (said he, pressing my hand), the moment I am no more, to write—Alas! how will you set about it? a letter to Madam Einsiedlern, the lady I am promised to—Let her know that I die her's; inform her fully of my unhappy fate! Send her my last

Patkul,

Patkul. last and eternal farewell! My death is in truth disgraceful; but my manner of meeting it will, I hope, by heaven's and your assistance, render it holy and blessed. This news will be her only consolation. Add farther, dear Sir, that I thanked her with my latest breath for the sincere affection she bore me: May she live long and happy: This is my dying wish.—I gave him my hand in promise that I would faithfully perform all he desired.

"Afterwards he took up a book: 'This (said he) is of my own writing. Keep it in remembrance of me, and as a proof of my true regard for religion. I could wish it might have the good fortune to be presented to the king, that he may be convinced with what little foundation I have been accused of atheism.' Taking it from his hand, I assured him that my colonel would not fail to present it as soon as opportunity offered.

"The rest of his time was employed in prayer, which he went through with a very fervent devotion. On the 30th of September I was again with him at four in the morning. The moment he heard me he arose, and rendering thanks to God, assured me he had not slept so soundly for a long time. We went to prayers; and in truth his piety and devout frame of mind were worthy of admiration. About six he said he would begin his confession, before the din and clamour of the people without could rise to disturb his thoughts. He then kneeled down, and went through his confession in a manner truly edifying. The sun beginning to appear above the horizon, he looked out of the window, saying, *Salve festa dies!* 'This is my wedding-day. I looked, alas! for another, but this is the happier; for to-day shall my soul be introduced by her heavenly bridegroom into the assembly of the blessed!' He then asked me, whether I yet knew in what way he was to die? I answered, that I did not. He conjured me, by the sacred name of Jesus, not to forsake him; for that he should find in my company some consolation even in the midst of tortures. Casting his eye on the paper that lay on the table, 'This will (said he) can never be finished.' I asked him, whether he would put his name to what was already written? 'No (replied he, with a deep sigh), I will write that hated name no more. My relations will find their account in another place; salute them from me.' He then addressed himself again to God in prayer, and continued his devotions till the lieutenant entered to conduct him to the coach. He wrapped himself up in his cloak, and went forward a great pace, guarded by 100 horsemen. Being arrived at the place of execution, we found it surrounded by 300 foot soldiers; but at the sight of the stakes and wheels, his horror is not to be described. Clapping me in his arms, 'Beg of God (he exclaimed) that my soul may not be thrown into despair amidst these tortures! I comforted, I adjured him, to fix his thoughts on the death of Jesus Christ, who for our sins was nailed to a cross.

"Being now on the spot where he was to suffer, he bid the executioner to do his duty well, and put into his hands some money which he got ready for that purpose. He then stretched himself out upon the wheel; and while they were stripping him naked, he begged me to pray that God would have mercy on him, and bear up his soul in agony. I did so; and turning to all the spectators, said to them, Brethren,

join with me in prayer for this unhappy man. 'Yes (cried he), assist me all of you with your supplications to heaven.' Here the executioner gave him the first stroke. His cries were terrible: 'O Jesus! Jesus! have mercy upon me.' This cruel scene was much lengthened out, and of the utmost horror; for as the headsmen had no skill in his business, the unhappy victim received upwards of 15 several blows, with each of which were intermixed the most piteous groans and invocations of the name of God. At length, after two strokes given on the breast, his strength and voice failed him. In a faltering dying tone, he was just heard to say, 'Cut off my head!' and the executioner still lingering, he himself placed his head on the scaffold: After four strokes with an hatchet, the head was separated from the body, and the body quartered. Such was the end of the renowned Patkul."

Charles XII. has been very generally and severely censured for not pardoning him, and we are not inclined to vindicate the sovereign. Yet it must be remembered, that Patkul was guilty of a much greater crime than that which drew upon him the displeasure of Charles XI. He incited foreign powers to attack his country when under the government of a boy, hoping, as he said himself, that it would in such circumstances become an easy conquest. He was therefore a rebel of the worst kind; and where is the absolute monarch that is ready to pardon such unnatural rebellion? Let it be remembered, too, that Charles, among whose faults no other instance of cruelty has been numbered, certainly thought that, in ordering the execution of Patkul, he was discharging his duty. That monarch, it is known, believed in the possibility of discovering the philosopher's stone. Patkul, when under sentence of death, contrived to impose so far upon the senate at Stockholm, as to persuade them that he had, in their presence, converted into gold a quantity of baser metal. An account of this experiment was transmitted to the king, accompanied with a petition to his majesty for the life of so valuable a subject; but Charles, blending magnanimity with his severity, replied with indignation, that he would not grant to interest what he had refused to the calls of humanity and the intreaties of friendship.

PATMOS (anc. geog.), one of the Sporades (Dionysius); 30 miles in compass (Pliny); concerning which we read very little in authors. It was rendered famous by the exile of St John and the Revelation showed him there. The greatest part of interpreters think that St John wrote them in the same place during the two years of his exile; but others think that he did not commit them to writing till after his return to Ephesus. The island of Patmos is between the island of Icaria and the promontory of Miletus. Nothing has done it more honour than to have been the place of the banishment of St John. It is now called *Patino*, or *Pacino*, or *Putmol*, or *Palmosa*. Its circuit is five and twenty or thirty miles. It has a city called *Patmos*, with a harbour, and some monasteries of Greek monks. It is at present in the hands of the Turks. It is considerable for its harbours; but the inhabitants derive little benefit from them, because the corsairs have obliged them to quit the town and retire to a hill on which St John's convent stands. This convent is a citadel consisting of several irregular towers, and is a

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Patra.

substantial building seated on a very steep rock. The whole island is very barren, and without wood; however, it abounds with partridges, rabbits, quails, turtles, pigeons, and snipes. All their corn does not amount to 1000 barrels in a year. In the whole island there are scarce 300 men: but there are above 20 women to one man, who expect that all strangers who land in the island should carry some of them away. To the memory of St John is an hermitage on the side of a mountain, where there is a chapel not above eight paces long and five broad. Over head they show a chink in the rock, through which they pretend that the Holy Ghost dictated to St John. E. Long. 26. 84. N. Lat. 37. 24.

PATNA, a town of Asia, in the dominions of the Great Mogul, to the north of the kingdom of Bengal, where the English have factories for saltpetre, borax, and raw silk. It is the capital of the province of Bahar, a dependency of Bengal, in the empire of Indostan, situated in a pleasant country, 400 miles east of Agra. It extends seven miles in length on the banks of the Ganges, and is about half a mile in breadth.—Mr Rennel gives strong reasons for supposing it to be the ancient PALIBOTHA. The town is large and populous, but the houses are built at a distance from each other. E. Long. 85. 40. N. Lat. 45. 25.

PATOMACK, a large river of North America, in Virginia, which rises in the Alleghany mountains, separates Virginia from Maryland, and falls into Chesapeake bay. It is about seven miles broad, and is navigable for near 200 miles.

PATONCE, in heraldry, is a cross, flory at the ends; from which it differs only in this, that the ends, instead of turning down like a fleur-de-lis, are extended somewhat in the pattee form. See FLORY.

PATRÆ, a city of Achaia. This place was visited by Dr Chandler, who gives the following account of it. "It has been often attacked by enemies, taken, and pillaged. It is a considerable town, at a distance from the sea, situated on the side of a hill, which has its summit crowned with a ruinous castle. This made a brave defence in 1447 against Sultan Morat, and held out until the peace was concluded, which first rendered the Morea tributary to the Turks. A dry flat before it was once the port, which has been choked with mud. It has now, as in the time of Strabo, only an indifferent road for vessels. The house of Nicholas Paul, Esq; the English consul, stood on part of the wall either of the theatre or the odéum. By a fountain was a fragment of a Latin inscription. We saw also a large marble bust much defaced; and the French consul showed us a collection of medals. We found nothing remarkable in the citadel. It is a place of some trade, and is inhabited by Jews as well as by Turks and Greeks. The latter have several churches. One is dedicated to St Andrew the apostle, who suffered martyrdom there, and is of great sanctity. It had been recently repaired. The site by the sea is supposed that of the temple of Ceres. By it is a fountain. The air is bad, and the country round about over-run with the low shrub called *glycyrrhiza* or liquorice."

Of its ancient state, the same author speaks thus: "Patrae assisted the Ætolians when invaded by the Gauls under Brennus; but afterwards was unfortu-

nate, reduced to extreme poverty, and almost abandoned. Augustus Cæsar reunited the scattered citizens, and made it a Roman colony, settling a portion of the troops which obtained the victory of Actium, with other inhabitants from the adjacent places. Patrae flourished and enjoyed dominion over Naupactus, Ceanthæa, and several cities of Achaia. In the time of Pausanias, Patrae was adorned with temples and porticoes, a theatre, and an odéum which was superior to any in Greece but that of Atticus Herodes at Athens. In the lower part of the city was a temple of Bacchus Æsymnetes, in which was an image preserved in a chest, and conveyed, it was said, from Troy by Eury-pylus; who, on opening it, became disordered in his senses. By the port were temples; and by the sea, one of Ceres, with a pleasant grove and a prophetic fountain of unerring veracity in determining the event of any illness. After supplicating the goddess with incense, the sick person appeared, dead or living, in a mirror suspended so as to touch the surface of the water. In the citadel of Patrae was a temple of Diana Laphria, with her statue in the habit of a huntress of ivory and gold, given by Augustus Cæsar when he laid waste Calydon and the cities of Ætolia to people Nicopolis. The Patrensiens honoured her with a yearly festival, which is described by Pausanias who was a spectator. They formed a circle round the altar with pieces of green wood, each 16 cubits long, and within heaped dry fuel. The solemnity began with a most magnificent procession, which was closed by the virgin-priestesses in a chariot drawn by stags. On the following day, the city and private persons offered at the altar fruits, and birds, and all kinds of victims, wild-boars, stags, deer, young wolves, and beasts full grown; after which the fire was kindled. He relates, that a bear and another animal forced a way through the fence, but were reconducted to the pile. It was not remembered that any wound had ever been received at this ceremony, though the spectacle and sacrifice were as dangerous as savage. The number of women at Patrae was double that of the men. They were employed chiefly in a manufacture of flax which grew in Elis, weaving garments, and attire for the head."

PATRANA, or PASTRANA, a town of New Castile in Spain, with the title of a duchy. It is seated between the rivers Tajo and Tajuna, in W. Long. 2. 45. N. Lat. 40. 26.

PATRAS, an ancient and flourishing town of European Turkey, in the Morea, capital of a duchy, with a Greek archbishop's see. It is pretty large and populous; and the Jews, who are one-third part of the inhabitants, have four synagogues. There are several handsome mosques and Greek churches. The Jews carry on a great trade in silk, leather, honey, wax, and cheese. There are cypress trees of a prodigious height, and excellent pomegranates, citrons, and oranges. It has been several times taken and retaken, and it is just now in the hands of the Turks. It is seated in E. Long. 21. 45. N. Lat. 38. 17.

PATRICA, a town of Italy, in the territory of the church, and in the Campagna of Rome, towards the sea-coast, and eight miles east of Ostia. About a mile from this place is a hill called *Monte de Livano*, which some have thought to be the ancient Lavinium founded by Æneas.

Patra
||
Patrica.

Patres,
Patriarch.

PATRES CONSCRIPTI. See CONSCRIPT and SENATOR.

PATRIARCH, PATRIARCHA, one of those first fathers who lived towards the beginning of the world, and who became famous by their long lines of descendants. Abraham, Isaac, and Jacob, and his twelve sons, are the patriarchs of the Old Testament; Seth, Enoch, &c. were antediluvian patriarchs,

The authority of patriarchal government existed in the fathers of families, and their first-born after them, exercising all kinds of ecclesiastical and civil authority in their respective households; and to this government, which lasted till the time of the Israelites dwelling in Egypt, some have ascribed an absolute and despotic power, extending even to the punishment by death. In proof of this, is produced the curse pronounced by Noah upon Canaan (Gen. ix. 25.); but it must be observed, that in this affair Noah seems to have acted rather as a prophet than a patriarch. Another instance of supposed despotic power is Abraham's turning Hagar and Ishmael out of his family (Gen. xxi. 9, &c.); but this can hardly be thought to furnish evidence of any singular authority vested in the patriarchs, as such, and peculiar to those ages. The third instance brought forward to the same purpose is that of Jacob's denouncing a curse upon Simeon and Levi (Gen. xlix. 7.), which is maintained by others to be an instance of prophetic inspiration more than of patriarchal power. The fourth instance is that of Judah with regard to Tamar (Gen. xxxviii. 24.); with regard to which it is remarked, that Jacob, the father of Judah, was still living; that Tamar was not one of his own family; and that she had been guilty of adultery, the punishment of which was death by burning; and that Judah on this occasion might speak only as a prosecutor.

On the whole, however, it is difficult to say which of these opinions are most agreeable to truth. Men who believe the origin of civil government, and the obligation to obedience, to arise from a supposed original contract, either real or implied, will be naturally led to weaken the authority of the patriarchs: and those again who esteem government to be a divine institution, will be as apt to raise that authority to the highest pitch that either reason or scripture will permit them. It cannot be denied, that authority existed in fathers, and descended to their first-born, in the first ages of the world; and it is neither unnatural nor improbable to imagine, that the idea of hereditary power and hereditary honours was first taken from this circumstance. But whether authority has descended through father and son in this way to our times, is a circumstance that cannot in one instance be asserted, and can be denied in a thousand. The real source of the dignity and of the authority of modern times seems to have been, skill in the art of war, and success in the conduct of conquests.

Jewish PATRIARCH, a dignity, respecting the origin of which there are a variety of opinions. The learned authors of the Universal History think, that the first appearance and institution of those patriarchs happened under Nerva the successor of Domitian. It seems pro-

bable that the patriarchs were of the Aaronic or Levitical race; the tribe of Judah being at that time too much depressed, and too obnoxious to the Romans to be able to assume any external power. But of whatever tribe they were, their authority came to be very considerable. Their principal business was to instruct the people; and for this purpose they instituted schools in several cities. And having gained great reputation for their extraordinary learning, zeal, and piety, they might, in time, not only bring a great concourse of other Jews from other parts, as from Egypt and other western provinces of their dispersion, but likewise prove the means of their patriarchal authority's being acknowledged there. From them they ventured at length to levy a kind of tribute, in order to defray the charges of their dignity, and of the officers (A) under them, whose business it was to carry their orders and decisions through the other provinces of their dispersion, and to see them punctually executed by all, that some shadow of union at least might be kept up among the western Jews. They likewise nominated the doctors who were to preside over their schools and academies; and these were in process of time styled *chiefs* and *princes*, in order to raise the credit of that dignity, or to imply the great regard which their disciples were to pay to them. These chiefs became at length rivals of the patriarchs; and some of them possessed both dignities at once; an usurpation which caused not only great confusion amongst them, but oftentimes very violent and bloody contests. However, as the Jewish Rabbies have trumped up a much older era for this patriarchal dignity, and have given us a succession of them down to the fifth century, in which it was abolished, it will not be amiss to give our readers the substance of what they have written of the rise and progress of this order of men; and at the same time to show them the absurdity and falsehood of that pretended succession to this imaginary dignity.

According to them, the first patriarch was Hillel, surnamed the *Babylonian*, because he was sent for from thence to Jerusalem about 100 years before the ruin of their capital, or 30 years before the birth of Christ, to decide a dispute about the keeping of Easter, which on that year fell out on the Sabbath-day; and it was on account of his wise decision that he was raised to that dignity, which continued in his family till the said fifth century. He was likewise looked upon as a second Moses, because he lived like him 40 years in obscurity, 40 more in great reputation for learning and sanctity, and 40 more in possession of this patriarchal dignity. They make him little inferior to that lawgiver in other of his excellencies, as well as in the great authority he gained over the whole Jewish nation. The wonder will be, how Herod the Great, who was so jealous of his own power, could suffer a stranger to be raised to such a height of it, barely for having decided a dispute which must in all likelihood have been adjudged by others long before that time.

However, Hillel was succeeded by his son Simeon, whom many Christians pretend to have been the venerable old person of that name, who received the divine infant in his arms. The Jews give him but a very

(A) These were called *Apostoli* or *Legati*.

Patriarch. very obscure patriarchate; though the authors above quoted make him, moreover, chief of the sanhedrim; and Epiphanius says, that the priestly tribe hated him so much for giving so ample a testimony to the divine child, that they denied him common burial. But it is hardly credible that St Luke should have so carelessly passed over his two-fold dignity, if he had been really possessed of them, and have given him no higher title than that of a just and devout man.

He was succeeded by Jochanan, not in right of descent, but of his extraordinary merit, which the Rabbies, according to custom, have raised to so surprising a height, that, according to them, if the whole heavens were paper, all the trees in the world pens, and all the men writers, they would not suffice to pen down all his lessons. He enjoyed his dignity but two years, according to some, or five according to others: and was the person who, observing the gates of the temple to open of their own accord, cried out, "O temple, temple! why art thou thus moved! We know that thou art to be destroyed, seeing Zechariah hath foretold it, saying, 'Open thy gates, O Lebanon, and let the flames consume thy cedars.'" Upon this he is further reported to have complimented Vespasian, or rather, as some have corrected the story, Titus, with the title of *king*, assuring him that it was a royal person who was to destroy that edifice; on which account they pretend that general gave him leave to remove the sanhedrim to Japhne.

The Jewish writers add, that he likewise erected an academy there, which subsisted till the death of Akiba; and was likewise the seat of the patriarch; and consisted of 300 schools, or classes of scholars. Another he erected at Lydda, not far from Japhne, and where the Christians have buried their famed St George. He lived 120 years, and being asked, what he had done to prolong his life? he gave this wise answer; I never made water nearer a house of prayer than four cubits: I never disguised my name: I have taken care to celebrate all festivals: and my mother hath even sold my head ornaments to buy wine enough to make me merry on such days; and left me at her death 300 hogheads of it, to sanctify the Sabbath.—The doctors that flourished in his time were no less considerable, both for their number and character; particularly the famed Rabbi Chanina, of whom the Bath Col was heard to say, that the world was preserved for the sake of him; and R. Nicodemus, whom they pretend to have stopped the course of the sun, like another Joshua.

He was succeeded by Gamaliel, a man, according to them, of unsufferable pride; and yet of so universal authority over all the Jews, not only in the west, but over the whole world, that the very monarchs suffered his laws to be obeyed in their dominions, not one of them offering to obstruct the execution of them. In his days flourished Samuel the Lefi, who composed a prayer full of the bitterest curses against heretics, by which they mean the Christians; and which are still in use to this day. Gamaliel was no less an enemy to them; and yet both have been challenged, the former as the celebrated master of our great apostle, the other as his disciple in his unconverted state.

Simon II. his son and successor, was the first martyr who died during the siege of Jerusalem. The

people so regretted his death, that an order was given, instead of 10 bumpers of wine, which were usually drank at the funeral of a saint, to drink 13 at his, on account of his martyrdom. These bumpers were in time multiplied, they tell us, to such shameful height, that the sanhedrim was forced to make some new regulations to prevent that abuse.

These are the patriarchs which, the Rabbies tell us, preceded the destruction of the temple; and we need no farther confutation of this pretended dignity, than the silence of the sacred historians, who not only make not the least mention of it, but assure us all along that they were the high-priests who presided in the sanhedrim; and before whom all cases relating to the Jewish religion were brought and decided. It was the high-priest who examined and condemned our Saviour; that condemned St Stephen; that forbade the apostles to preach in Christ's name; and who sat as judge on the great apostle at the head of that supreme court. The same may be urged from Josephus, who must needs have known and mentioned this pretended dignity, if any such there had been; and yet is so far from taking the least notice of it, that, like the evangelists, he places the pontiffs alone at the head of all the Jewish affairs; and names the high-priest Ananus as having the care and direction of the war against the Romans;—which is an evident proof that there were then no such patriarchs in being.

To all this let us add, that if there had been any such remarkable succession, the Talmudists would have preserved it to future ages; whereas, neither they, nor any of the ancient authors of the Jewish church, make any mention of it; but only some of their doctors, who have written a considerable time after them, as of writers to whom little credit can be given in points of this nature; especially as there are such unsurmountable contradictions between them, as no authors either Jewish or Christian have, with all their pains, been hitherto able to reconcile.

Their succession, according to the generality of those rabbies, stands as follows:

1. Hillel the Babylonian. 2. Simeon the son of Hillel. 3. Gamaliel the son of Simeon. 4. Simeon II. the son of Gamaliel. 5. Gamaliel II. the son of Simeon II. 6. Simeon III. the son of Gamaliel II. 7. Judah the son of Simeon III. 8. Gamaliel III. the son of Judah. 9. Judah II. the son of Gamaliel III. 10. Hillel II. son of Judah II. 11. Judah III. son of Hillel II. 12. Hillel III. son of Judah III. 13. Gamaliel IV. son of Hillel III.

According to Gants Tzemach David, who hath reduced them to 10, they are,

1. Hillel the Babylonian. 2. Simeon the son of Hillel. 3. Rabb. Gamaliel Rebona. 4. R. Simeon the son of Gamaliel. 5. Rabban Gamaliel his son. 6. R. Jehudah the prince. 7. Hillel the prince, his son. 8. Rabban Gamaliel the Old. 9. Simeon III. 10. R. Judah, Nassi or prince.

On the whole, it cannot be doubted but that their first rise was in Nerva's time, however much Jewish pride may have prompted them to falsify, and to assert their origin to have been more ancient than it really was. Nor have the Jews been faithful in giving an account of the authority of these men. They have exaggerated their power beyond all bounds, for the purpose of repelling

Patriarchs. repelling the arguments of Christians : for their power was certainly more showy than substantial. In time, however, they certainly imposed upon the people ; and what power they did possess (which the Romans only allowed to be in religious matters, or in such as were connected with religion) they exercised with great rigour. Their pecuniary demands, in particular, became very exorbitant ; and was the cause of their suppression in the year 429.

PATRIARCHS, among Christians, are ecclesiastical dignitaries, or bishops, so called from their paternal authority in the church. The power of patriarchs was not the same in all, but differed according to the different customs of countries, or the pleasures of kings and councils. Thus the patriarch of Constantinople grew to be a patriarch over the patriarchs of Ephesus and Cæsarea, and was called the *œcumenical and universal patriarch* ; and the patriarch of Alexandria had some prerogatives which no other patriarch but himself enjoyed, such as the right of consecrating and approving every single bishop under his jurisdiction.

The patriarchate has been ever esteemed the supreme dignity in the church : the bishop had only under him the territory of the city of which he was bishop ; the metropolitan superintended a province, and had for suffragans the bishops of his province ; the primate was the chief of what was then called a *diocese* (A), and had several metropolitans under him ; and the patriarch had under him several dioceses, composing one exarchate, and the primates themselves were under him.

Usher, Pagi, De Marca, and Morinus, attribute the establishment of the grand patriarchates to the apostles themselves ; who, in their opinion, according to the description of the world then given by geographers, pitched on the three principal cities in the three parts of the known world ; viz. Rome in Europe, Antioch in Asia, and Alexandria in Africa : and thus formed a trinity of patriarchs. Others maintain that the name patriarch was unknown at the time of the council of Nice ; and that for a long time afterwards patriarchs and primates were confounded together, as being all equally chiefs of dioceses, and equally superior to metropolitans, who were only chiefs of provinces. Hence Socrates gives the title patriarch to all the chiefs of dioceses, and reckons ten of them. Indeed, it does

not appear that the dignity of patriarch was appropriated to the five grand sees of Rome, Constantinople, Alexandria, Antioch, and Jerusalem, till after the council of Chalcedon in 451 ; for when the council of Nice regulated the limits and prerogatives of the three patriarchs of Rome, Antioch, and Alexandria, it did not give them the title of patriarchs, though it allowed them the pre-eminence and privileges thereof ; thus when the council of Constantinople adjudged the second place to the bishop of Constantinople, who till then was only a suffragan of Heraclea, it said nothing of the patriarchate. Nor is the term *patriarch* found in the decree of the council of Chalcedon, whereby the fifth place is assigned to the bishop of Jerusalem ; nor did these five patriarchs govern all the churches.

There were besides many independent chiefs of dioceses, who, far from owning the jurisdiction of the grand patriarchs, called themselves *patriarchs* ; such as that of Aquileia ; nor was Carthage ever subject to the patriarch of Alexandria. Mosheim * imagines that the bishops, who enjoyed a certain degree of pre-eminence over the rest of their order, were distinguished by the Jewish title of patriarchs in the fourth century. The authority of the patriarchs gradually increased, till, about the close of the fifth century, all affairs of moment within the compass of their patriarchate came before them, either at first hand or by appeals from the metropolitans. They consecrated bishops ; assembled yearly in council the clergy of their respective districts ; pronounced a decisive judgment in those cases where accusations were brought against bishops ; and appointed vicars or deputies, clothed with their authority, for the preservation of order and tranquillity in the remoter provinces. In short, nothing was done without consulting them ; and their decrees were executed with the same regularity and respect as those of the princes.

It deserves to be remarked, however, that the authority of the patriarchs was not acknowledged through all the provinces without exception. Several districts, both in the eastern and western empires, were exempted from their jurisdiction. The Latin church had no patriarchs till the sixth century ; and the churches of Gaul, Britain, &c. were never subject to the authority of the patriarch of Rome, whose authority only extended to the suburbicary provinces. There was no primacy, no ex-

Patriarchs

* Eccles. Hist. vol. 1. p. 284.

I

archate

(A) The word *diocese* was then of very different import from what it bears now. Under the article *EPISCOPACY*, it was observed, that the first founders of churches regulated their extent and the jurisdiction of their bishops by the divisions of the Roman empire into civil jurisdictions. One of these divisions was into provinces and dioceses. A province comprised the cities of a whole region subjected to the authority of one chief magistrate, who resided in the metropolis or chief city of the province. A diocese was a still larger district, comprehending within it several provinces, subject to the controul of a chief magistrate, whose residence was in the metropolis of the diocese. The jurisdiction of the bishops of the Christian church was established upon this model. The authority of a private bishop extended only over the city in which he resided, together with the adjacent villages and surrounding tract of country. This district was called *παροικία*, though it comprehended many parishes in the modern sense of that word. Under Arcadius and Honorius the empire was divided into thirteen dioceses : 1. The Oriental diocese, containing fifteen provinces ; 2. The diocese of Egypt, six provinces ; 3. The Asiatic diocese, ten provinces ; 4. The Pontic diocese, ten provinces ; 5. The diocese of Thrace, six provinces ; 6. The diocese of Macedonia, six provinces ; 7. The diocese of Decia, five provinces ; 8. The Italic diocese, seventeen provinces ; 9. The diocese of Illyricum, six provinces ; 10. The diocese of Africa, six provinces ; 11. The Spanish diocese, seven provinces ; 12. The Gallican diocese, seventeen provinces ; 13. The Britannic diocese, five provinces. Each of these provinces comprehended many *παροικίαι*, and each *παροικία* many modern parishes. See Bingham's *Origines Sacre*, Book ix.

Patriarchal
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Patrick.

archate nor patriarchate, owned here; but the bishops, with the metropolitans, governed the church in common. Indeed, after the name patriarch became frequent in the west, it was attributed to the bishops of Bourges and Lyons; but it was only in the first signification, viz. as heads of dioceses. Du Cange says, that there have been some abbots who have borne the title of patriarchs.

PATRIARCHAL CROSS, in heraldry, is that where the shaft is twice crossed; the lower arms being longer than the upper ones.

PATRICIAN, a title given, among the ancient Romans, to the descendants of the hundred, or, as some will have it, of the two hundred first senators chosen by Romulus; and by him called *patres*, "fathers." Romulus established this order after the example of the Athenians; who were divided into two classes, viz. the *euaspides patricios*, and *demolivos populares*. Patricians, therefore, were originally the nobility; in opposition to the plebeians. They were the only persons whom Romulus allowed to aspire to the magistracy; and they exercised all the functions of the priesthood till the year of Rome 495. But the cognizance and character of these ancient families being almost lost and extinguished by a long course of years, and frequent changes in the empire, a new kind of patricians were afterwards set on foot, who had no pretensions from birth, but whose title depended entirely on the emperor's favour. This new patriciate, Zoizimus tells us, was erected by Constantine, who conferred the quality on his counsellors, not because they were descended from the ancient fathers of the senate, but because they were the fathers of the republic or of the empire. This dignity in time became the highest of the empire. Justinian calls it *summam dignitatem*. In effect, the patricians seem to have had the precedence of the *consulares*, and to have taken place before them in the senate; though F. Faber asserts the contrary. What confounds the question is, that the two dignities often met in the same person; because the patriciate was only conferred on those who had gone through the first offices of the empire, or had been consuls. Pope Adrain made Charlemagne take the title of patrician before he assumed the quality of emperor; and other popes have given the title to other kings and princes by reason of its eminence.

PATRICIAN is also a title of honour often conferred on men of the first quality in the time of our Anglo-Saxon kings. See **THANE**.

PATRICIAN Deities, *Patricii Dii*, in mythology, were Janus, Saturn, the Genius, Pluto, Bacchus, the Sun, the Moon, and the Earth.

PATRICIANS, in ecclesiastical writers, were ancient sectaries, who disturbed the peace of the church in the beginning of the third century: thus called from their founder *Patricius*, preceptor of a Marcionite called *Symmachus*. His distinguishing tenet was, that the substance of the flesh is not the work of God, but that of the devil: on which account his adherents bore an implacable hatred to their own flesh; which sometimes carried them so far as to kill themselves. They were also called **TATIANITES**, and made a branch of the **ENCRATITÆ**.

PATRICK (St), the apostle of Ireland, and second bishop of that country. He was born April 5th A. D. 373, of a good family, at Kirk Patric near

Dumbarton, in what is now called Scotland, but then comprehended under the general name of Britain.—His baptismal name *Succath*, signifies, in the British language, "valiant in war." On some inroad of certain exiles from Ireland he was taken prisoner, and carried into that kingdom, where he continued six years in the service of Milcho, who had bought him of three others, when Patric acquired the new name of *Cothraig*, or *Ceathar-Tigh*, i. e. *four families*. In this time he made himself master of the Irish language, and at last made his escape, and returned home on board a ship. About two years after, he formed a design of converting the Irish, either in consequence of a dream, or of reflection on what he had observed during his acquaintance with them. The better to qualify himself for this undertaking, he travelled to the continent, where he continued 35 years, pursuing his studies under the direction of his mother's uncle St Martin, bishop of Tours, who had ordained him deacon; and after his death with St German, bishop of Auxerre, who ordained him priest, and gave him his third name *Mawn* or *Maginim*.

An ancient author, Henricus Antifioderensis, who wrote a book concerning the miracles of St German, considers it as the highest honour of that prelate to have been the instructor of St Patrick: "As the glory of a father shines in the government of his sons, out of the many disciples in religion who are reported to have been his sons in Christ; suffice it briefly to mention one by far the most famous, as the series of his actions shows, Patrick the particular apostle of Ireland, who being under his holy discipline 18 years, derived no little knowledge in the inspired writings from such a source. The most godly divine pontiff, considering him alike distinguished in religion, eminent for virtue, and steadfast in doctrine; and thinking it absurd to let one of the best labourers remain inactive in the Lord's vineyard, recommended him to Celestine, Pope of Rome, by his presbyter Segetius, who was to carry to the apostolic see a testimonial of ecclesiastical merit of this excellent man. Approved by his judgment, supported by his authority, and confirmed by his blessing, he set out for Ireland; and being peculiarly destined to that people as their apostle, instructed them at that time by his doctrine and miracles; and now does and will forever display the wonderful power of his apostleship." Lastly, Pope Celestine consecrated him bishop, and gave him his most familiar name *Patricius*, expressive of his honourable descent; and to give lustre and weight to the commission which he now charged him with to convert the Irish. Palladius had been here a year before him on the same design, but with little success: the saints Kieran, Ailbe, Declan, and Ilar, were precursors both to Palladius and Patrick. But the great office of apostle of Ireland was reserved for our prelate, who landed in the country of the Eoilein, or at Wicklow, A. D. 447. His first convert was Sinell, eighth in descent from Cormac king of Leinster; but not meeting with encouragement, he proceeded to Dublin, and thence to Ulster, where he founded a church (afterwards the famous abbey of Saul, in the county of Down), remarkable for its position, being made out of a barn, and its greatest length reaching from north to south. After labouring seven years indefatigably in his great work, he returned

Patrick.

Patrick. ed to Britain, which he delivered from the heresies of Pelagius and Arius; engaged several eminent persons to assist him; visited the Isle of Man, which he converted in 440, when the bishopric was founded; and, A. D. 448, returned to the see of Armagh (A), which he had founded three years before; and in 13 years more completed the conversion of the whole island (B). After giving an account of his commission at Rome, he once more returned hither, and spent the remainder of his life between the monasteries of Armagh and Saul, superintending and enforcing the great plan of doctrine and discipline which he had established. After having established schools, or an academy here, he closed his life and ministry at Saul abbey, in the 120th year of his age, March 17. A. D. 493, and was buried at Down afterwards, in the same grave with St Briget and St Columb, in the same place. Respecting his burial-place, however, there have been great disputes; and it has been as great a subject of debate with the religious, as Homer's birth-place was formerly among the cities of Greece. Those of Down lay claim to it, on the authority of the following verses:

These three in Down lie in tomb one,
Briget, Patricius, and Columba pious.

Those of Glaffenbury in England, from the old monuments of their church: And some Scots affirm him to have been both born and buried among them at Glasgow. His genuine works were collected and printed by Sir James Ware, 1656. His immediate successor in this see was St Binen or Begnus.

Order of St PATRICK, an institution which took place in Ireland in the year 1783. On the fifth of February, in that year, the king ordered letters-patent to be passed under the great seal of the kingdom of Ireland, for creating a society or brotherhood, to be called *knights of the illustrious order of St Patrick*, of which his majesty, his heirs, and successors, shall perpetually be sovereigns, and his majesty's lieutenant-general and general-governor of Ireland, &c. for the time being, shall officiate as grand-masters; and also for appointing Prince Edward, and several of the prime nobility of Ireland, knights companions of the said illustrious order.

PATRICK (Simon), a very learned English bishop, was born at Gainsborough in Lincolnshire in 1626. In 1644 he was admitted into Queen's college, Cambridge, and entered into holy orders. After being for some time chaplain to Sir Walter St John, and vicar of

the church at Battersea in Surry, he was preferred to the rectory of St Paul's, Covent-garden, in London, where he continued all the time of the plague in 1665 among his parishioners, to their great comfort. In 1668 he published his *Friendly Debate* between a Conformist and a Nonconformist. This was answered by the Dissenters, whom he had much exasperated by it; but by his moderation and candour toward them afterwards, they were perfectly reconciled to him, and he brought over many of them to the communion of the established church. In 1678 he was made dean of Peterborough, where he was much beloved. In 1682, Dr Lewis de Moulin, who had been a history-professor at Oxford, and written many bitter books against the church of England, sent for Dr Patrick upon his sick bed, and made a solemn declaration of his regret on that account, which he signed, and it was published after his death. During the reign of King James, the dean's behaviour showed that he had nothing more at heart than the Protestant religion; for which he ventured all that was dear to him, by preaching and writing against the errors of the church of Rome. In 1687 he published a prayer composed for that difficult time, when persecution was expected by all who stood firm to their religion. The year after the Revolution, the dean was appointed bishop of Chichester, and was employed with others of the new bishops to settle the affairs of the church in Ireland. In 1691 he was translated to the see of Ely, in the room of the deprivileged Bishop Turner. He died in 1707, after having published various works; among which the most distinguished are his *Paraphrases and Commentaries on the Holy Scriptures*, three volumes folio. These, with Lowth on the Proverbs, Arnold on the Apocrypha, and Whitby on the New Testament, make a regular continued commentary in English on all the sacred books.

PATRIMONY, a right or estate inherited by a person from his ancestors.

The term *patrimony* has been also given to church-estates or revenues; in which sense authors still say, the patrimony of the church of Rimini, Milan, &c. The church of Rome hath patrimonies in France, Africa, Sicily, and many other countries. To create the greater respect to the estates belonging to the church, it was usual to give their patrimonies the names of the saints they held in the highest veneration: thus the estate of the church of Ravenna was called the *patrimony of St Apollinarius*; that of Milan, the *patrimony*

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of

(A) At Armagh St Patrick founded, A. D. 445 or 447, a priory of Augustine canons, dedicated to St Peter and St Paul, much enriched by the archbishops; restored by Imar O Hedegan in the 12th century. It was granted, A. D. 1611, to Sir Toby Caulfield, knight. St Patrick also founded there a house of canonesses of the same order, under his sister Lupita, called *Templena firta*, or the "house of miracles."

We are told, that Armagh was made a metropolitanical see in honour of St Patrick; in consequence of which it was held in the highest veneration not only by bishops and priests, but also by kings and bishops, as the venerable Bede informs us.

(B) There is a cave in the county of Donegal or Tir-connel, near the source of the Liffey, which, it is pretended, was dug by Ulysses, in order to hold conversations with infernals. The present inhabitants call it *Ellan n' Fradatory*, or the "Island of Purgatory, and Patrick's Purgatory." They affirm, with a pious credulity, that St Patrick the apostle of Ireland, or some abbot of that name, obtained of God by his earnest prayers, that the pains and torments which await the wicked after this life might be here set forth to view, in order the more easily to recover the Irish from their sinful state and heathenish errors.

Patrick,
Patrimony.

Patriotism. of *St Ambrose*; and the estates of the Roman church were called the *patrimony of St Peter in Abruzzo*, the *patrimony of St Peter in Sicily*, and the like.

What is now called *St Peter's patrimony* is only the duchy of *Castro*, and the territory of *Orvietto*. See *CASTRO*, &c.

PATRIOTISM, a love of one's country, which is one of the noblest passions that can warm and animate the human breast. It includes all the limited and particular affections to our parents, children, friends, neighbours, fellow-citizens, and countrymen. It ought to direct and limit their more confined and partial actions within their proper and natural bounds, and never let them encroach on those sacred and first regards we owe to the great public to which we belong. Were we solitary creatures, detached from the rest of mankind, and without any capacity of comprehending a public interest, or without affections leading us to desire and pursue it, it would not be our duty to mind it, nor criminal to neglect it. But as we are parts of the public system, and are not only capable of taking in large views of its interests, but by the strongest affections connected with it, and prompted to take a share of its concerns, we are under the most sacred ties to prosecute its security and welfare with the utmost ardour, especially in times of public trial.

"Zeal for the public good (says Mr Addison) is the characteristic of a man of honour and a gentleman, and must take place of pleasures, profits, and all other private gratifications: that whosoever wants this motive, is an open enemy, or an inglorious neuter to mankind, in proportion to the misapplied advantages with which nature and fortune have blessed him." This love of our country does not import an attachment to any particular soil, climate, or spot of earth, where perhaps we first drew our breath, though those natural ideas are often associated with the moral ones; and, like external signs or symbols, help to ascertain and bind them; but it imports an affection to that moral system or community, which is governed by the same laws and magistrates, and whose several parts are variously connected one with the other, and all united upon the bottom of a common interest. Wherever this love of our country prevails in its genuine vigour and extent, it swallows up all sordid and selfish regards; it conquers the love of ease, power, pleasure, and wealth; nay, when the amiable partialities of friendship, gratitude, private affection, or regards to a family, come in competition with it, it will teach us to sacrifice all, in order to maintain the rights, and promote and defend the honour and happiness of our country. To pursue therefore our private interests in subordination to the good of our country; to be examples in it of virtue, and obedient to the laws; to choose such representatives as we apprehend to be the best friends to its constitution and liberties; and if we have the power, to promote such laws as may improve and perfect it; readily to embrace every opportunity for advancing its prosperity; cheerfully to contribute to its defence and support; and, if need be, to die for it:—these are among the duties which every man, who has the happiness to be a member of our free and Protestant constitution, owes to his country.

The constitution of man is such, that the most selfish passions, if kept within their proper bounds, have a tendency to promote the public good. There is

no passion of more general utility than patriotism; but its origin may unquestionably be termed *selfish*. The love of one's relations and friends is the most natural expansion of self-love: this affection connects itself too with local circumstances, and sometimes cannot easily be separated from them. It often varies, as relationship or place varies; but acquires new power when the whole community becomes its object. It was therefore with singular propriety that the poet said, "Self-love and social are the same." Under the article *CALAIS* we have already given the outlines of the transactions of its siege by Edward III. during which the inhabitants displayed a degree of patriotism truly wonderful. History scarcely contains a more distinguished instance of true patriotic virtue than on this occasion. We shall therefore give a fuller account of this remarkable affair, as one of the best examples that can possibly be selected of the virtue we have been explaining. The inhabitants, under Count Vienne their gallant governor, made an admirable defence against a well disciplined and powerful army. Day after day the English effected many a breach, which they repeatedly expected to storm by morning; but, when morning appeared, they wondered to behold new ramparts raised nightly, erected out of the ruins which the day had made. France had now put her sickle into her second harvest since Edward with his victorious army sat down before the town. The eyes of all Europe were intent on the issue. The English made their approaches and attacks without remission; but the citizens were as obstinate in repelling all their efforts. At length, famine did more for Edward than arms. After the citizens had devoured the lean carcases of their half-starved cattle, they tore up old foundations and rubbish in search of vermin: they fed on boiled leather, and the weeds of exhausted gardens; and a morsel of damaged corn was accounted matter of luxury. In this extremity they resolved to attempt the enemy's camp. They boldly sallied forth; the English joined battle; and, after a long and desperate engagement, Count Vienne was taken prisoner; and the citizens, who survived the slaughter, retired within their gates. On the captivity of their governor, the command devolved upon Eustace Saint Pierre, the mayor of the town, a man of mean birth, but of exalted virtue. Eustace soon found himself under the necessity of capitulating, and offered to deliver to Edward the city, with all the possessions and wealth of the inhabitants, provided he permitted them to depart with life and liberty. As Edward had long since expected to ascend the throne of France, he was exasperated to the last degree against these people, whose sole valour had defeated his warmest hopes; he therefore determined to take an exemplary revenge, though he wished to avoid the imputation of cruelty. He answered by Sir Walter Mauny, that they all deserved capital punishment, as obstinate traitors to him, true and notable sovereign; that, however, in his wonted clemency, he consented to pardon the bulk of the plebeians, provided they would deliver up to him six of their principal citizens with halters about their necks, as victims of due atonement for that spirit of rebellion with which they had inflamed the common people. All the remains of this desolate city were convened in the great square; and like men arraigned at a tribunal from whence there was no appeal, expect-

Patriotism ed with throbbing hearts the sentence of their conqueror. When Sir Walter had declared his message, consternation and pale dismay was impressed on every face: each looked upon death as his own inevitable lot; for how should they desire to be saved at the price proposed? Whom had they to deliver up, save parents, brothers, kindred, or valiant neighbours, who had so often exposed their lives in their defence? To a long and dead silence, deep sighs and groans succeeded, till Eustace Saint Pierre ascending a little eminence, thus addressed the assembly: "My friends and fellow-citizens, you see the condition to which we are reduced; we must either submit to the terms of our cruel and ensnaring conqueror, or yield up our tender infants, our wives, and chaste daughters, to the bloody and brutal lusts of the violating soldiery. We well know what the tyrant intends by his specious offers of mercy. It does not satiate his vengeance to make us merely miserable, he would also make us criminal: he would make us contemptible; he will grant us life on no condition, save that of our being unworthy of it. Look about you, my friends, and fix your eyes on the person whom you wish to deliver up as the victims of your own safety. Which of these would you appoint to the rack, the ax, or the halter? Is there any here who has not watched for you, who has not fought for you, who has not bled for you? Who, through the length of this inveterate siege, has not suffered fatigues and miseries a thousand times worse than death, that you and yours might survive to days of peace and prosperity? Is it your preservers, then, whom you would destine to destruction? You will not, you cannot, do it. Justice, honour, humanity, make such a treason impossible. Where then is our resource? Is there any expedient left, whereby we may avoid guilt and infamy on one hand, or the desolation and horrors of a sacked city on the other? There is, my friends, there is one expedient left; a gracious, an excellent, a god-like expedient! Is there any here to whom virtue is dearer than life! Let him offer himself an oblation for the safety of his people! he shall not fail of a blessed approbation from that power, who offered up his only Son for the salvation of mankind." He spoke—but an universal silence ensued. Each man looked round for the example of that virtue and magnanimity in others, which all wished to approve in themselves, though they wanted the resolution. At length Saint Pierre resumed: "It had been base in me, my fellow-citizens, to promote any matter of damage to others, which I myself had not been willing to undergo in my own person. But I held it ungenerous to deprive any man of that preference and estimation, which might attend a first offer on so signal an occasion: for I doubt not but there are many here as ready, nay, more zealous for this martyrdom than I can be, however modesty and the fear of imputed ostentation may withhold them from being foremost in exhibiting their merits. Indeed the station to which the captivity of Count Vienne has unhappily raised me, imports a right to be the first in giving my life for your sakes. I give it freely, I give it cheerfully. Who comes next? Your son! exclaimed a youth, not yet come to maturity.—Ah, my child! cried St Pierre; I am then twice sacrificed.—But no—I have rather begotten thee a second time.—Thy years are

few, but full, my son; the victim of virtue has reached the utmost purpose and goal of mortality. Who next, my friends? This is the hour of heroes.—Your kinsman, cried John de Aire! Your kinsman, cried James Wissant! Your kinsman, cried Peter Wissant!—"Ah! (exclaimed Sir Walter Mauny, bursting into tears), why was I not a citizen of Calais?" The sixth victim was still wanting, but was quickly supplied by lot, from numbers who were now emulous of so ennobling an example. The keys of the city were then delivered to Sir Walter. He took the six prisoners into his custody. He ordered the gates to be opened, and gave charge to his attendants to conduct the remaining citizens with their families through the camp of the English. Before they departed, however, they desired permission to take their last adieu of their deliverers.—What a parting! what a scene! they crowded with their wives and children about St Pierre and his fellow-prisoners. They embraced, they clung around, they fell prostrate before them. They groaned; they wept aloud; and the joint clamour of their mourning passed the gates of the city, and was heard throughout the camp. At length Saint Pierre and his fellow victims appeared under the conduct of Sir Walter and his guard. All the tents of the English were instantly emptied. The soldiers poured from all parts, and arranged themselves on each side to behold, to contemplate, to admire this little band of patriots as they passed. They murmured their applause of that virtue which they could not but revere even in enemies; and they regarded those ropes which they had voluntarily assumed about their necks as ensigns of greater dignity than that of the British Garter. As soon as they had reached the royal presence, "Mauny (says the king), are these the principal inhabitants of Calais?" "They are (says Mauny); they are not only the principal men of Calais, they are the principal men of France, my lord, if virtue has any share in the act of ennobling." "Were they delivered peaceably, (says Edward)? Was there no resistance, no commotion among the people?" "Not in the least, my lord. They are self-delivered, self-devoted, and come to offer up their inestimable heads as an ample equivalent for the ransom of thousands."

The king, who was highly incensed at the length and difficulty of the siege, ordered them to be carried away to immediate execution; nor could all the remonstrances and intreaties of his courtiers divert him from his cruel purpose. But what neither a regard to his own interest and honour, what neither the dictates of justice, nor the feelings of humanity, could effect, was happily accomplished by the more powerful influence of conjugal affection. The queen, who was then big with child, being informed of the particulars respecting the six victims, flew into her husband's presence, threw herself on her knees before him, and, with tears in her eyes, besought him not to stain his character with an indelible mark of infamy, by committing such a horrid and barbarous deed. Edward could refuse nothing to a wife whom he so tenderly loved, and especially in her condition; and the queen, not satisfied with having saved the lives of the six burghers, conducted them to her tent, where she applauded their virtue, regaled them with a plentiful

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ful repast, and having made them a present of money and clothes, sent them back to their fellow-citizens.

Plutarch's
Life of Ly-
curgus.

The love of their country, and of the public good, seems to have been the predominant passion of the Spartans. Pedaretus having missed the honour of being chosen one of the three hundred who had a certain rank of distinction in the city, went home extremely pleased and satisfied; saying, "He was overjoyed there were three hundred men in Sparta more honourable than himself."

The patriotism of the Romans is well known, and has been justly admired. We shall content ourselves at present with the following example; a zeal and patriotic devotion similar to which is perhaps scarcely equalled, and certainly is not exceeded, in history.

Dion. lib.
viii. p. 570.
and Rollin's
Rom. Hist.
v. i. p. 366.

Rome, under the consuls Cæso Fabius and T. Virginius, had several wars to sustain, less dangerous than troublesome, against the Æqui, Volsci, and Veientes. To put a stop to the incursions of the last, it would have been necessary to have established a good garrison upon their frontiers to keep them in awe. But the commonwealth, exhausted of money, and menaced by abundance of other enemies, was not in a condition to provide for so many different cares and expences. The family of the Fabii showed a generosity and love of their country that has been the admiration of all ages. They applied to the senate, and by the mouth of the consul demanded as a favour that they would be pleased to transfer the care and expences of the garrison necessary to oppose the enterprizes of the Veientes to their house, which required an assiduous rather than a numerous body, promising to support with dignity the honour of the Roman name in that post. Every body was charmed with so noble and unheard-of an offer; and it was accepted with great acknowledgment. The news spread over the whole city, and nothing was talked of but the Fabii. Every body praised, every body admired and extolled them to the skies. "If there were two more such families in Rome," said they, "the one might take upon them the war against the Volsci, and the other against the Æqui, whilst the commonwealth remained quiet, and the forces of particulars subdued the neighbouring states."

Early the next day the Fabii set out, with the consul at their head, robed, and with his insignia. Never was there so small, and at the same time so illustrious, an army seen; for which we have the authority of Livy. Three hundred and six soldiers, all patricians, and of the same family, of whom not one but might be judged worthy of commanding an army, march against the Veii full of courage and alacrity, under a captain of their own name, Fabius. They were followed by a body of their friends and clients, animated by the same spirit and zeal, and actuated only by great and noble views. The whole city flocked to see so fine a sight; praised those generous soldiers in the highest terms; and promised them consulships, triumphs, and the most glorious rewards. As they passed before the capitol and the other temples, every body implored the gods to take them into their protection; to favour their departure and undertaking, and to afford them a speedy and happy return. But those prayers were not heard. When they arrived near the river Crimera, which is not far from Veii,

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Patricians.

they built a fort upon a very rough and steep mountain for the security of the troops, which they surrounded with a double fosse, and flanked with several towers. This settlement, which prevented the enemy from cultivating their ground, and ruined their commerce with strangers, incommoded them extremely. The Veientes not finding themselves strong enough to ruin the fort which the Romans had erected, applied to the Hetrurians, who sent them very considerable aid. In the mean time the Fabii, encouraged by the great success of their incursions into the enemy's country, made farther progress every day. Their excessive boldness made the Hetrurians conceive thoughts of laying ambuscades for them in several places. During the night they seized all the eminences that commanded the plain, and found means to conceal a great number of troops upon them. The next day they dispersed more cattle about the country than they had done before. The Fabii being apprized that the plains were covered with flocks and herds, and defended by only a very small number of troops, they quitted their fort, leaving in it only a sufficient number to guard it. The hopes of a great booty quickened their march. They arrived at the place in order of battle; and were preparing to attack the advanced guard of the enemy, when the latter, who had their orders, fled without staying till they were charged. The Fabii, believing themselves secure, seized the shepherds, and were preparing to drive away the cattle. The Hetrurians then quitted their skulking places, and fell upon the Romans from all sides, who were most of them dispersed in pursuit of their prey. All they could do was to rally immediately; and that they could not effect without great difficulty. They soon saw themselves surrounded on all sides, and fought like lions, selling their lives very dear. But finding that they could not sustain this kind of combat long, they drew up in a wedge, and advancing with the utmost fury and impetuosity, opened themselves a passage through the enemy that led to the side of the mountain. When they came thither, they halted, and fought with fresh courage, the enemy leaving them no time to respire. As they were upon the higher ground, they defended themselves with advantage, notwithstanding their small number; and beating down the enemy, who spared no pains in the attack, they made a great slaughter of them. But the Veientes having gained the top of the mountain by taking a compass, fell suddenly upon them, and galled them exceedingly from above with a continual shower of darts. The Fabii defended themselves to their last breath, and were all killed to a man. The Roman people were highly affected with the loss of this illustrious band of patriots. The day of their defeat was ranked amongst their unfortunate days, called *nefasti*, on which the tribunals were shut up, and no public affair could be negotiated, or at least concluded. The memory of these public-spirited patricians, who had so generously sacrificed their lives and fortunes for the service of the state, could not be too much honoured.

PATRIPASSIANS, PATRIPASSIANI, in church-history, a Christian sect, who appeared about the latter end of the second century; so called, from their ascribing the passion to the Father; for they asserted the unity of God in such a manner as to destroy all distinctions.

Patroclus, Patrol. distinctions of persons, and to make the Father and Son precisely the same; in which they were followed by the Sabellians and others. The author and head of the Patripassians was Praxeas, a philosopher of Phrygia in Asia. Swedenbourg and his followers seem to hold the same faith.

PATROCLUS, a Grecian chief at the Trojan war. He was the son of Menœtius, by Sthenela, whom some call *Philomela* or *Polymela*. The murder of Clytonymus, the son of Amphidamas, by accident, in the time of his youth, made him fly from Opus, where his father reigned. He went to the court of Peleus king of Phthia. He was cordially received, and contracted the most intimate friendship with Achilles the king's son. When the Greeks went to the Trojan war, Patroclus went with them at the express desire of his father, who had visited the court of Peleus; and he accordingly embarked with ten ships from Phthia. He was the constant companion of Achilles; lodged in the same tent; and when he refused to appear in the field of battle, because he had been offended by Agamemnon, Patroclus imitated his example, and by his absence was the cause of much evil to the Greeks. At last, however, Nestor prevailed upon him to return to the war, and Achilles permitted him to appear in his armour. The bravery of Patroclus, together with the terror which the sight of the arms of Achilles inspired, soon routed the victorious armies of the Trojans, and obliged them to fly to the city for safety. He would have broken down the walls; but Apollo, who interested himself for the Trojans, opposed him; and Hector, at the instigation of that god, dismounted from his chariot to attack him as he attempted to strip one of the Trojans whom he had slain. This engagement was obstinate; but Patroclus was at length overpowered by the valour of Hector, and the interposition of Apollo. His arms became the property of the conqueror; and Hector would have severed his head from his body had not Ajax and Menelaus prevented it. His body was at last recovered, and carried to the Grecian camp, where Achilles received it with the loudest lamentations. His funerals were observed with the greatest solemnity. Achilles sacrificed near the burning pile twelve young Trojans, four of his horses, and two of his dogs; and the whole was concluded by the exhibition of funeral games, in which the conquerors were liberally rewarded by Achilles. The death of Patroclus, as described by Homer, gave rise to new events. Achilles forgot his resentment against Agamemnon, and entered the field to avenge the fall of his friend; and his anger was gratified only by the slaughter of Hector, who had more powerfully kindled his wrath by appearing at the head of the Trojan armies in the armour which had been taken from the body of Patroclus. The patronymic of Aëtorides is often applied to Patroclus, because Aëtor was father to Menœtius.

PATROL, in war, a round or march made by the guards or watch in the night-time, to observe what passes in the streets, and to secure the peace and tranquillity of a city or camp. The patrol generally consists of a body of five or six men, detached from a body on guard, and commanded by a serjeant.

They go every hour of the night, from the beating of the tattoo until the reveille: they are to walk in the streets in garrisons, and all over the camp in the field,

to prevent disorders, or any number of people from assembling together: they are to see the lights in the soldiers barracks put out, and to take up all the soldiers they find out of their quarters. Sometimes patrols consist of an officer and 30 or 40 men, as well infantry as cavalry; but then the enemy is generally near at hand, and consequently the danger greater.

PATRON, among the Romans, was an appellation given to a master who had freed his slave. As soon as the relation of master expired, that of patron began: for the Romans, in giving their slaves their freedom, did not despoil themselves of all rights and privileges in them; the law still subjected them to considerable services and duties towards their patrons, the neglect of which was very severely punished.

Patron was also a name which the people of Rome gave to some great man, under whose protection they usually put themselves; paying him all kinds of honour and respect, and denominating themselves his clients; while the patron, on his side, granted them his credit and protection. They were therefore mutually attached and mutually obliged to each other; and by this means, in consequence of reciprocal ties, all those seditions, jealousies, and animosities, which are sometimes the effect of a difference of rank, were prudently avoided: for it was the duty of the patron to advise his clients in points of law, to manage their suits, to take care of them as of his own children, and secure their peace and happiness. The clients were to assist their patrons with money on several occasions; to ransom them or their children when taken in war; to contribute to the portions of their daughters; and to defray, in part, the charges of their public employments. They were never to accuse each other, or take contrary sides; and if either of them was convicted of having violated this law, the crime was equal to that of treason, and any one was allowed to kill the offender with impunity. This patronage was a tie as effectual as any consanguinity or alliance, and had a wonderful effect towards maintaining union and concord among the people for the space of 600 years; during which time we find no dissensions nor jealousies between the patrons and their clients, even in the times of the republic when the populace frequently mutinied against those who were most powerful in the city.

PATRON, in the church of Rome, a saint whose name a person bears, or under whose protection he is put, and whom he takes particular care to invoke; or a saint in whose name a church or order is founded.

PATRON, in the canon or common law, is a person who, having the advowson of a parsonage, vicarage, or the like spiritual promotion, belonging to his manor, hath on that account the gift and disposition of the benefice, and may present to it whenever it becomes vacant. The patron's right of disposing of a benefice originally arises either from the patron or his ancestors, &c. being the founders or builders of the church; from their having given lands for the maintenance thereof; or from the church's being built on their ground; and frequently from all three together.

PATRONAGE, or **ADVOWSON**, a sort of incorporeal hereditament, consisting in the right of presentation to a church or ecclesiastical benefice. *Advowson, advocatio*, signifies in *clientelam recipere*, the taking

Patronage.
Blackstone's
Commentaries.

taking into protection; and therefore is synonymous with patronage, *patronatus*: and he who has the right of advowson is called the *patron of the church*. For when lords of manors first built churches on their own demesnes, and appointed the tithes of those manors to be paid to the officiating ministers, which before were given to the clergy in common (from whence arose the division of parishes), the lord who thus built a church, and endowed it with glebe or land, had of common right a power annexed of nominating such minister as he pleased (provided he were canonically qualified) to officiate in that church, of which he was the founder, endower, maintainer, or, in one word, the patron.

Advowsons are either advowsons *appendant*, or advowsons *in gross*. Lords of manors being originally the only founders, and of course the only patrons, of churches, the right of patronage or presentation, so long as it continues annexed to the possession of the manor, as some have done from the foundation of the church to this day, is called an *advowson appendant*: and it will pass, or be conveyed, together with the manor, as incident and appendant thereto, by a grant of the manor only, without adding any other words. But where the property of the advowson has been once separated from the property of the manor by legal conveyance, it is called an *advowson in gross*, or at large, and never can be appendant any more; but it is for the future annexed to the person of its owner, and not to his manor or lands.

Advowsons are also either *presentative*, *collative*, or *donative*. An advowson presentative, is where the patron hath a right of presentation to the bishop or ordinary, and moreover to demand of him to institute his clerk if he finds him canonically qualified: and this is the most usual advowson. An advowson collative, is where the bishop and patron are one and the same person: in which case the bishop cannot present to himself; but he does, by the one act of collation, or conferring the benefice, the whole that is done in common cases, by both presentation and institution. An advowson donative, is when the king, or any subject by his licence, doth found a church or chapel, and ordains that it shall be merely in the gift or disposal of the patron; subject to his visitation only, and not to that of the ordinary; and vested absolutely in the clerk by the patron's deed of donation, without presentation, institution, or induction. This is said to have been anciently the only way of conferring ecclesiastical benefices in England; the method of institution by the bishop not being established more early than the time of Archbishop Becket in the reign of Henry II. and therefore, though pope Alexander III. in a letter to Becket, severely inveighs against the *prava consuetudo*, as he calls it, of investiture conferred by the patron only, this however shows what was then the common usage. Others contend that the claim of the bishops to institution is as old as the first planting of Christianity in this island; and in proof of it they allege a letter from the English nobility to the pope in the reign of Henry the third, recorded by Matthew Paris, which speaks of presentation to the bishop as a thing immemorial. The truth seems to be, that, where the benefice was to be conferred on a mere layman, he was first presented to the bishop in order to receive ordination,

who was at liberty to examine and refuse him: but where the clerk was already in orders, the living was usually vested in him by the sole donation of the patron; till about the middle of the 12th century, when the pope and his bishops endeavoured to introduce a kind of feudal dominion over ecclesiastical benefices, and, in consequence of that, began to claim and exercise the right of institution universally, as a species of spiritual investiture.

However this may be, if, as the law now stands, the true patron once waves this privilege of donation, and presents to the bishop, and his clerk is admitted and instituted, the advowson is now become for ever presentative, and shall never be donative any more. For these exceptions to general rules and common right are ever looked upon by the law in an unfavourable view, and construed as strictly as possible. If therefore the patron, in whom such peculiar right resides, does once give up that right, the law, which loves uniformity, will interpret it to be done with an intention of giving it up for ever; and will therefore reduce it to the standard of other ecclesiastical livings. See further, LAW, Part III. Sect. v. N^o clix. 5—10.

Arms of PATRONAGE, in heraldry, are those on the top of which are some marks of subjection and dependence: thus the city of Paris lately bore the fleurs-de-lis in chief, to show her subjection to the king; and the cardinals, on the top of their arms, bear those of the pope, who gave them the hat, to show that they are his creatures.

PATRONYMIC, among grammarians, is applied to such names of men or women as are derived from those of parents or ancestors.

Patronymics are derived, 1. From the father; as Pelides, *i. e.* Achilles the son of Peleus. 2. From the mother; as Philytides, *i. e.* Chiron the son of Philyra. 3. From the grandfather on the father's side; as Æacides, *i. e.* Achilles the grandson of Æacus. 4. From the grandfather by the mother's side; as Atlantiades, *i. e.* Mercury the grandson of Atlas. And, 5. From the kings and founders of nations; as Romulidæ, *i. e.* the Romans, from their founder king Romulus.

The termination of Greek and Latin patronymics are chiefly four, viz. *des*, of which we have examples above; as, as Thaumantias, *i. e.* Iris the daughter of Thaumias; *is*, as Atlantis, *i. e.* Electra the daughter of Atlas; and *ne*, as Nerine, the daughter of Nereus. Of these terminations *des* is masculine; and *as*, *is*, and *ne*, feminine: *des* and *ne* are of the first declension, *as* and *is* of the third.

The Russians, in their usual mode of address, never prefix any title or appellation of respect to their names; but persons of all ranks, even those of the first distinction, call each other by their Christian names, to which they add a patronymic. These patronymics are formed in some cases by adding Vitch (the same as our Fitz, as Fitzherbert, or the son of Herbert) to the Christian name of the father; in others by Of or Ef; the former is applied only to persons of condition, the latter to those of inferior rank. Thus,

Ivan Ivanovitch, Ivan Ivanof, is Ivan the son of Ivan: Peter Alexievitch, Peter Alexeof, Peter the son of Alexey.

The female patronymic is Efna or Ofna, as Sophia Alex-

Patronymic.

Patros
||
Pattans

Alexeefna, or Sophia the daughter of Alexey; Maria Ivanofna, or Maria the daughter of Ivan.

Great families are also in general distinguished by a surname, as those of Romanof, Galitzin, Sheremetof, &c.

PATROS, mentioned by Jeremiah and Ezekiel, appears from the context to be meant of a part of Egypt. Bocchart thinks it denotes the Higher Egypt: the Septuagint translate it the country of *Pathure*; in Pliny we have the *Nomos Phaturites* in the Thebais; in Ptolemy, *Pathyris*, probably the metropolis. From the Hebrew appellation *Patros* comes the gentilitious name *Pathrusim*, Moses.

PATRU (Oliver), a counsellor in parliament, and dean of the French academy, was born at Paris in 1604. He had an excellent faculty both of speaking and writing. Upon his admission into the French academy in 1640, he made an oration of thanks, that gave rise to the custom of admisory speeches, which are still in use in that society. Mr de Vaugilas owns himself much indebted to him for his assistance in composing his remarks on the French tongue, of which he was by far the greatest master in France; so that he was consulted as an oracle by all the best writers of that nation.

Patru was estimable for the qualities of his heart, as well as for those of the head: was honest, generous, sincere; and preserved a gayness of character, which no ill fortune could alter or affect. For this famous advocate, in spite of all his great talents, lived almost in a state of indigence. The love of the belles lettres made him neglect the law; and the barren glory of being an oracle to the best French writers had more charms for him, than all the profits of the bar. Hence he became so poor, as to be reduced to the necessity of selling his books, which seemed dearer to him than his life; and would actually have sold them for an under-price, if Boileau had not generously advanced him a larger sum, with this further privilege, that he should have the use of them as long as he lived. His death was preceded by a tedious illness, during which he received a present of 500 crowns from Colbert, as a mark of the esteem which the king had for him. He died the 16th of January 1681. The prodigious care and exactness with which he retouched and finished every thing he wrote, did not permit him to publish much. His miscellaneous works were printed at Paris in 1670, 4to; the third edition of which, in 1714, 4to, was augmented with several pieces. They consist of Pleadings, Orations, Letters, Lives of some of his Friends, Remarks upon the French Language, &c.

PATTANS, PATANS, or AFGHANS, a very warlike race of men, who had been subjects of the vast empire of Boehara. They revolted under their governor Abstagi, in the 10th century, and laid the foundation of the empire of Ghizni or Gazna. In the Dissertation prefixed to vol. III. of Dow's History, we have this account of the Pattans.

"They are divided into distinct communities, each of which is governed by a prince, who is considered by his subjects as the chief of their blood, as well as their sovereign. They obey him without reluctance, as they derive credit to their family by his greatness. They attend him in his wars with the attachment

which children have to a parent; and his government, though severe, partakes more of the rigid discipline of a general than the caprice of a despot. Rude, like the face of their country, and fierce and wild as the storms which cover their mountains, they are addicted to incursions and depredations, and delight in battle and plunder. United firmly to their friends in war, to their enemies faithless and cruel, they place justice in force, and conceal treachery under the name of address."

The empire, which took its rise from the revolt of the Pattans, under a succession of warlike princes rose to a surprising magnitude. In the beginning of the 11th century, it extended from Ispahan to Bengal, and from the mouths of the Indus to the banks of the Jaxartes, which comprehends at least half of the continent of Asia. They had fled to the mountains on the borders of Persia, that they might escape the sword, or avoid submitting to the conquerors of India; and there they formed their state, which the Moguls were never able thoroughly to subdue. Indeed they sometimes exercised depredations on the adjacent countries; nor was it possible for the Moguls either to prevent it or to extirpate them. They were sensible that the climate and soil of the delicious plains would only serve to rob them of that hardness they contracted in the hills to which they were confined; they, therefore, for a long time gave no indications of a desire to exchange them for more pleasing abodes, or a more accessible situation. This enabled them to brave the victorious army of Nadir Shah, whose troops they quietly suffered to penetrate into Hindostan, and waited his return with the spoils of that country.—They then harassed his army in the straits and defiles of the mountains, and proved themselves such absolute masters of the passes, that they forced him to purchase from them his passage into Persia.

In the beginning of the present century, they had spread themselves over the adjoining province of Kandabar; and such was the imbecility of the Persian empire at that time, that many other provinces and tributary states were also induced to revolt. When the king or shah of that time, whose name was *Husseïn*, opposed the growing power of this warlike people, he was totally defeated, and Ispahan was besieged and obliged to surrender, after having suffered dreadful calamities, to an army consisting of only 30,000 men. In consequence of this, they brought about a revolution in Persia, and subjected it to themselves. This sovereignty, however, they only held for seven years and 21 days, having fallen a sacrifice to the enterprising spirit of Kouli Khan, or Nadir Shah. See PERSIA, and in the Appendix AFGHANS.

PAU, a town of France, in the province of Gascony and territory of Bearne, with a parliament, a mint, and a castle. "The city of Pau (says Wraxal*) * *Tour thro* will be for ever memorable in history, since it was the birth-place of Henry IV. That immortal prince was born in the castle, then the usual residence of the kings of Navarre. It stands on one of the most romantic and singular spots I have ever seen, at the west end of the town, upon the brow of a rock which terminates perpendicularly. Below runs the Gave, a river or rather a torrent which rises in the Pyrenées, and empties itself into the Adour. On the other side, about two miles

Pattans,
Pau.

Pau. miles off, is a ridge of hills covered with vineyards, which produce the famous *Vin de Jorenon*, so much admired; and beyond all, at the distance of nine leagues, appear the Pyrenees themselves, covering the horizon from east to west, and bounding the prospect. The castle, though now in a state of decay, is still habitable; and the apartments are hung with tapestry, said to be the work of Jane queen of Navarre, and mother of Henry IV. Gaston IV. Count de Foix, who married Leonora heiress of the crown of Navarre, began the edifice in 1464; but his successor Henry d'Albret completed and enlarged it about the year 1519, when he made choice of the city of Pau for his residence, and where, during the remainder of his reign, he held his little court. In a chamber, which by its size was formerly a room of state, is a fine whole length portrait of that Jane queen of Navarre whom I have just mentioned. Her dress is very splendid, and resembles those in which our Elizabeth is usually painted. Her head-dress is adorned with pearls; round her neck she wears a ruff; and her arms, which are likewise covered with pearls, are concealed by her habit quite down to the wrist. At her waist hangs by a chain a miniature portrait. The fingers of her right hand play on the strings of a guitar; and in her left she holds an embroidered handkerchief. The painter has drawn her as young, yet not in the first bloom of youth. Her features are regular, her countenance thin, but rather inclining to long; the eyes hazel, and the eye-brows finely arched. Her nose is well-formed though large, and her mouth pretty. She was a great princess, of high spirit, and undaunted magnanimity. Her memory is not revered by the French historians, because she was the protectress of the Huguenots and the friend of Coligni; but the actions of her life evince her distinguished merit.

"In one of the adjoining chambers, is another portrait of Henry IV. himself when a boy; and on the second floor is the apartment in which he was born. The particulars of his birth are in themselves so curious, and as relating to so great and good a prince, are so peculiarly interesting, that I doubt not you will forgive my enumerating them, even though you should have seen them elsewhere.—His mother Jane had already lost two sons, the duke de Beaumont and the count de Marle. Henry d'Albret, her father, anxious to see an heir to his dominions, enjoined her (when she accompanied her husband Anthony of Bourbon to the wars of Picardy against the Spaniards), if she proved with child, to return to Pau, and to lie in there, as he would himself superintend the education of the infant from the moment of its birth. He threatened to disinherit her if she failed to comply with this injunction. The princess, in obedience to the king's command, being in the ninth month of her pregnancy, quitted Compiègne in the end of November, traversed all France in 15 days, and arrived at Pau, where she was delivered of a son on the 13th December 1553. She had always been desirous to see her father's will, which he kept in a golden box; and he promised to show it to her, provided she admitted of his being present at her delivery, and would during the pains of her labour sing a song in the Bearnois language. Jane had courage enough to perform this unusual request;

and the king being called on the first news of her illness, she immediately sung a Bearnois song, beginning, 'Notre Dame du bout du pont, aidez moi en cette heure.'—As she finished it, Henry* was born. The king instantly performed his promise, by giving her the box, together with a golden chain, which he tied about her neck; and taking the infant into his own apartment, began by making him swallow some drops of wine, and rubbing his lips with a root of garlic. They still show a tortoise-shell which served him for a cradle, and is preserved on that account. Several of the ancient sovereigns of Navarre resided and died in the castle of Pau. François Phœbus, who ascended the throne in 1479, died here in 1483."

Pau is a handsome city, well built, and contains near 6000 inhabitants. It is a modern place, having owed its existence entirely to the castle, and to the residence of the kings of Navarre. W. Long. o. 4. N. Lat. 43. 15.

PAVAN, or PAVANE, a grave dance used among the Spaniards, and borrowed from them; wherein the performers made a kind of wheel or tail before each other, like that of *pavo*, "a peacock;" from whence the name is derived. The pavane was formerly in great repute; and was danced by gentlemen with cap and sword; by those of the long robe in their gowns, by princes with their mantles, and by the ladies with their gown-tails trailing on the ground. It was called the *grand-ball*, from the solemnity with which it was performed. To moderate its gravity, it was usual to introduce several flourishes, passades, capers, &c. by way of episodes. Its tablature or score is given at large by Thoinot Arbeau in his *Orchesographie*.

PAVETTA, in botany: A genus of the monogynia order, belonging to the tetrandria class of plants; and in the natural method ranking under the 47th order, *Stellata*. The corolla is monopetalous and funnel-shaped above: the stigma carved; the berry dispermous.

PAVIA, an ancient and celebrated town of Italy, in the duchy of Milan, and capital of the Pavese, with an university and bishop's see. It was anciently called *Ticinum*, from its situation on that river, and lies 20 miles to the southward of Milan. It was formerly the capital of the Longobardic kingdom, and is still remarkable for the broadness of its streets, the beauty and richness of some of its churches, and for its university, founded by Charlemagne, and for several other literary institutions. Here is a bishop's see, which was once the richest in Italy, but is now dependent on the pope; and upon the whole the city is gone to decay, its trade being ruined through the exactions of the government. The few objects within it worth the public attention belong to the clergy or monks; and the church and convent of the Carthusians are inexpressibly noble, the court of the convent being one of the finest in the world, and surrounded by a portico supported by pillars, the whole a mile in circumference. It is defended by strong walls, large ditches, good ramparts, excellent bastions, and a bridge over the river Tassin. In the centre of the town is a strong castle, where the duke of Milan was wont to reside. There are a great number of magnificent castles, and some colleges. It was taken by the duke of Savoy in 1706; by the French

Pavani
Pavia.
* See Hen.
IV. King of
France.

Pavilion, Paving. French in 1733; by the French and Spaniards in 1745; but retaken by the Austrians in 1746. E. Long. 9. 5. N. Lat. 45. 10.

PAVILION, in architecture, signifies a kind of turret or building, usually insulated, and contained under a single roof; sometimes square, and sometimes in form of a dome: thus called from the resemblance of its roof to a tent.

Pavilions are sometimes also projecting pieces, in the front of a building, marking the middle thereof; sometimes the pavilion flanks a corner, in which case it is called an *angular pavilion*. The Louvre is flanked with four pavilions: the pavilions are usually higher than the rest of the building. There are pavilions built in gardens, commonly called *summer-houses*, *pleasure-houses*, &c. Some castles or forts consist only of a single pavilion.

PAVILION, in military affairs, signifies a tent raised on posts, to lodge under in the summer-time.

PAVILION, is also sometimes applied to flags, colours, ensigns, standards, banners, &c.

PAVILION, in heraldry, denotes a covering in form of a tent, which invests or wraps up the armories of divers kings and sovereigns, depending only on God and their sword.

The pavilion consists of two parts; the top, which is the chapeau, or coronet; and the curtain, which makes the mantle.

None but sovereign monarchs, according to the French heralds, may bear the pavilion entire, and in all its parts. Those who are elective, or have any dependence, say the heralds, must take off the head, and retain nothing but the curtains.

PAVILIONS, among jewellers, the undersides and corners of the brilliants, lying between the girdle and the collet.

PAVING, the construction of ground-floors, streets, or highways, in such a manner that they may be conveniently walked upon. In Britain, the pavement of the grand streets, &c. are usually of flint, or rubble-stone; courts, stables, kitchens, halls, churches, &c. are paved with tiles, bricks, flags, or fire-stone; sometimes with a kind of free-stone and rag-stone.

In some streets, *e. gr.* of Venice, the pavement is of brick: churches sometimes are paved with marble, and sometimes with mosaic-work, as the church of St Mark at Venice. In France, the public roads, streets, courts, &c. are all paved with gres or grit, a kind of free-stone.

In Amsterdam and the chief cities of Holland, they call their brick pavement the *burgher-masters pavement*, to distinguish it from the stone or flint pavement, which usually takes up the middle of the street, and which serves for carriages; the brick which borders it being destined for the passage of people on foot.

Pavements of free-stone, flint, and flags, in streets, &c. are laid dry, *i. e.* in a bed of sand; those of courts, stables, ground-rooms, &c. are laid in a mortar of lime and sand; or in lime and cement, especially if there be vaults or cellars underneath. Some masons, after laying a floor dry, especially of brick, spread a thin mortar over it; sweeping it backwards and forwards to fill up the joints. The several kinds of pavement are as various as the materials of which they are composed,

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and whence they derive the name by which they are distinguished; as,

Paving.

1. *Pebble-paving*, which is done with stones collected from the sea-beach, mostly brought from the islands of Guernsey and Jersey: they are very durable, indeed the most so of any stone used for this purpose. They are used of various sizes, but those which are from six to nine inches deep, are esteemed the most serviceable. When they are about three inches deep, they are denominated *bolders* or *bowlers*; these are used for paving court-yards, and other places not accustomed to receive carriages with heavy weights; when laid in geometrical figures, they have a very pleasing appearance.

2. *Rag-paving* was much used in London, but is very inferior to the pebbles; it is dug in the vicinity of Maidstone in Kent, from which it has the name of *Kentish rag-stone*; there are squared stones of this material for paving coach-tracks and foot-ways.

3. *Purbeck pitchens*; square stones used in footways; they are brought from the island of Purbeck, and also frequently used in court-yards; they are in general from six to ten inches square, and about five inches deep.

4. *Squared paving*, for distinction by some called *Scotch paving*, because the first of the kind paved in the manner that has been and continues to be paved, came from Scotland; the first was a clear close stone, called *blue whynn*, which is now disused, because it has been found inferior to others since introduced in the order they are hereafter placed.

5. *Granite*, a hard material, brought also from Scotland, of a reddish colour, very superior to the blue whynn quarry, and at present very commonly used in London.

6. *Guernsey*, which is the best, and very much in use; it is the same stone with the pebble before spoken of, but broken with iron hammers, and squared to any dimensions required of a prismoidical figure, set with its smallest base downwards. The whole of the foregoing paving should be bedded and paved in small gravel.

7. *Purbeck-paving*, for footways, is in general got in large surfaces about 2½ inches thick; the blue sort is the hardest and the best of this kind of paving.

8. *Yorkshire paving*, is an exceeding good material for the same purpose, and is got of almost any dimensions of the same thickness as the Purbeck. This stone will not admit the wet to pass through it, nor is it affected by the frost.

9. *Ryegate, or fire-stone paving*, is used for hearths, stoves, ovens, and such places as are liable to great heat, which does not affect the stone if kept dry.

10. *Newcastle flags*, are stones about two feet square, and 1½ or two inches thick; they answer very well for paving out-offices: they are somewhat like the Yorkshire.

11. *Portland paving*, with stone from the island of Portland; this is sometimes ornamented with black marble dots.

12. *Swedland paving*, is a black slate dug in Leicestershire, and looks well for paving halls, or in party-coloured paving.

13. *Marble paving*, is mostly variegated with different marbles, sometimes inlaid in mosaic.

14. *Flat brick paving*, done with brick laid in sand, mortar,

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mortar,

Paving,
Paul.

mortar, or groute, as when liquid lime is poured into the joints.

15. *Brick-on-edge paving*, done with brick laid edgewise in the same manner.

16. Bricks are also laid flat or edgewise in herringbone.

17. Bricks are also sometimes set endwise in sand, mortar, or groute.

18. Paving is also performed with paving bricks.

19. With ten inch tiles.

20. With foot tiles.

21. With clinkers for stables and outer offices.

22. With the bones of animals, for gardens, &c.

And, 23. We have knob-paving, with large gravel-stones, for porticoes, garden-seats, &c.

Pavements of churches, &c. frequently consist of stones of several colours; chiefly black and white, and of several forms, but chiefly squares and lozenges, artfully disposed. Indeed, there needs no great variety of colours to make a surprising diversity of figures and arrangements. M. Truchet, in the *Memoirs of the French Academy*, has shown by the rules of combination, that two square-stones, divided diagonally into two colours, may be joined together chequerwise 64 different ways: which appears surprising enough; since two letters or figures can only be combined two ways.

The reason is, that letters only change their situation with regard to the first and second, the top and bottom remaining the same; but in the arrangement of these stones, each admits of four several situations, in each whereof the other square may be changed 16 times, which gives 64 combinations.

Indeed, from a farther examination of these 64 combinations, he found there were only 32 different figures, each figure being repeated twice in the same situation, though in a different combination; so that the two only differed from each other by the transposition of the dark and light parts.

PAUL, formerly named SAUL, was of the tribe of Benjamin, a native of Tarsus in Cilicia, a Pharisee by profession; first a persecutor of the church, and afterwards a disciple of Jesus Christ, and apostle of the Gentiles. It is thought he was born about two years before our Saviour, supposing that he lived 68 years, as we read in a homily which is in the sixth volume of St Chrysostom's works. He was a Roman citizen (Acts xxii. 27, 28.), because Augustus had given the freedom of the city to all the freemen of Tarsus, in consideration of their firm adherence to his interests. His parents sent him early to Jerusalem, where he studied the law at the feet of Gamaliel a famous doctor (*id.* xxii. 3.) He made very great progress in his studies, and his life was always blameless before men; being very zealous for the whole observation of the law of Moses (*id.* xxvi. 4, 5.) But his zeal carried him too far; he persecuted the church, and insulted Jesus Christ in his members (1 Tim. i. 13.); and when the

protomartyr St Stephen was stoned, Saul was not only consenting to his death, but he even stood by and took care of the clothes of those that stoned him (Acts viii. 58, 59.) This happened in the 33d year of the common era, some time after our Saviour's death.

At the time of the persecution that was raised against the church, after the death of St Stephen, Saul was one of those that showed most violence in distressing the believers (Gal. i. 13. and Acts xxvi. 11.) He entered into their houses, and drew out by force both men and women, loaded them with chains, and sent them to prison (Acts viii. 3. and xxii. 4.) He even entered into the synagogues, where he caused those to be beaten with rods that believed in Jesus Christ, compelling them to blaspheme the name of the Lord. And having got credentials from the high-priest Caiaphas, and the elders of the Jews, to the chief Jews of Damascus, with power to bring to Jerusalem all the Christians he should find there, he went away full of threats, and breathing nothing but blood (Acts ix. 1, 2, 3, &c.) But as he was upon the road, and now drawing near to Damascus, all on a sudden about noon, he perceived a great light to come from heaven, which encompassed him and all those that were with him. This splendor threw them on the ground; and Saul heard a voice that said to him, "Saul, Saul, why persecutest thou me?" It was Jesus Christ that spoke to him. To whom Saul answered, "Who art thou, Lord?" And the Lord replied to him, "I am Jesus of Nazareth whom thou persecutest; it is hard for thee to kick against the pricks." Saul, all in consternation, asked, "Lord, what is it that thou wouldst have me do?" Jesus bid him arise and go to Damascus, where the will of the Lord should be revealed to him.

Saul then rose from the ground, and felt that he was deprived of sight; but his companions led him by the hand, and brought him to Damascus, where he continued three days blind, and without taking any nourishment. He lodged at the house of a Jew named Judas. On the third day, the Lord commanded a disciple of his, named Ananias, to go to find out Saul, to lay his hands upon him, and to cure his blindness. And as Ananias made excuses, saying that this man was one of the most violent persecutors of the church, the Lord said to him, Go and find him, because this man is an instrument that I have chosen, to carry my name before the Gentiles, before kings, and before the children of Israel; for I will show him how many things he must suffer for my name. Ananias went therefore, and found Saul, laid his hand upon him, and restored him to his sight; then rising, he was baptized, and filled with the Holy Ghost. After this he continued some days with the disciples that were at Damascus, preaching in the synagogues, and proving that Jesus was the Messiah (A)

From Damascus he went into Arabia (Gal. i. 17.), probably

(A) The conversion of such a man, at such a time, and by such means, furnishes one of the most complete proofs that have ever been given of the divine origin of our holy religion. That Saul, from being a zealous persecutor of the disciples of Christ, became all at once a disciple himself, is a fact which cannot be controverted without overturning the credit of all history. He must therefore have been converted in the miraculous

Paul.

Paul probably into the neighbourhood of Damascus, being then under the government of Aretas king of Arabia; and having remained there for a little while, he returned to Damascus, where he began again to preach the gospel. The Jews could not bear to see the progress that the gospel made here; and so resolved to put him to death: and they gained to their side the governor of Damascus, who was to apprehend him, and to deliver him to them. Of this Saul had early notice; and knowing that the gates of the city were guarded night and day to prevent him from making his escape, he was let down over the wall in a basket. And coming to Jerusalem to see Peter (Gal. i. 38.), the disciples were afraid to have any correspondence with him, not believing him to be a convert. But Barnabas having brought him to the apostles, Saul related to them the manner of his conversion, and all that had followed in consequence of it. Then he began to preach both to the Jews and Gentiles; and spoke to them with such strength of argument, that not being able to withstand him in reasoning, they resolved to kill him. For this reason, the brethren brought him to Cæsarea of Pale-

stine, from whence he came, probably by sea, into his own country Tarsus in Cilicia. Paul

There he continued about five or six years, from the year of Christ 37 to the year 43; when Barnabas coming to Antioch by the order of the apostles, and there having found many Christians, went to Tarsus to see Saul, and brought him with him to Antioch (Acts xi. 20, 25, 26.); where they continued together a whole year, preaching to and instructing the faithful. During this time, there happened a great famine in Judea (*id. ib.* 27, 28, &c.), and the Christians of Antioch having made some collections to assist their brethren at Jerusalem, they made choice of Paul and Barnabas to go thither with their offering. They arrived there in the year of Christ 44; and having acquitted themselves of their commission, they returned again to Antioch. They had not been there long before God warned them by the prophets he had in this church, that he had appointed them to carry his word into other places. Then the church betook themselves to fasting and praying, and the prophets Simeon, Lucius, and Manaen, laid their hands on them,

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culous manner in which he himself said he was, and of course the Christian religion be a divine revelation; or he must have been either an impostor, an enthusiast, or a dupe to the fraud of others. There is not another alternative possible.

If he was an impostor, who declared what he knew to be false, he must have been induced to act that part by some motive: (See MIRACLE). But the only conceivable motives for religious imposture are, the hopes of advancing one's temporal interest, credit, or power; or the prospect of gratifying some passion or appetite under the authority of the new religion. That none of these could be St Paul's motive for professing the faith of Christ crucified, is plain from the state of Judaism and Christianity at the period of his forsaking the former and embracing the latter faith. Those whom he left were the disposers of wealth, of dignity, of power, in Judea: those to whom he went were indigent men, oppressed, and kept from all means of improving their fortunes. The certain consequence therefore of his taking the part of Christianity was the loss not only of all that he possessed, but of all hopes of acquiring more; whereas, by continuing to persecute the Christians, he had hopes rising almost to a certainty of making his fortune by the favour of those who were at the head of the Jewish state, to whom nothing could so much recommend him as the zeal which he had shown in that persecution. As to credit or reputation, could the scholar of Gamaliel hope to gain either by becoming a teacher in a college of fishermen? Could he flatter himself, that the doctrines which he taught would, either in or out of Judea, do him honour, when he knew that "they were to the Jews a stumbling block, and to the Greeks foolishness?" Was it then the love of power that induced him to make this great change? Power! over whom? over a flock of sheep whom he himself had assisted to destroy, and whose very Shepherd had lately been murdered! Perhaps it was with the view of gratifying some licentious passion, under the authority of the new religion, that he commenced a teacher of that religion! This cannot be alleged; for his writings breathe nothing but the strictest morality, obedience to magistrates, order, and government, with the utmost abhorrence of all licentiousness, idleness, or loose behaviour, under the cloke of religion. We nowhere read in his works, that saints are above moral ordinances; that dominion is founded in grace; that monarchy is despotism which ought to be abolished; that the fortunes of the rich ought to be divided among the poor; that there is no difference in moral actions; that any impulses of the mind are to direct us against the light of our reason and the laws of nature; or any of those wicked tenets by which the peace of society has been often disturbed, and the rules of morality often broken, by men pretending to act under the sanction of divine revelation. He makes no distinctions like the impostor of Arabia in favour of himself; nor does any part of his life, either before or after his conversion to Christianity, bear any mark of a libertine disposition. As among the Jews, so among the Christians, his conversation and manners were blameless.—It has been sometimes objected to the other apostles, by those who were resolved not to credit their testimony, that, having been deeply engaged with Jesus during his life, they were obliged, for the support of their own credit, and from having gone too far to return, to continue the same professions after his death; but this can by no means be said of St Paul. On the contrary, whatever force there may be in that way of reasoning, it all tends to convince us, that St Paul must *naturally* have continued a Jew, and an enemy to Christ Jesus. If they were engaged on one side, he was as strongly engaged on the other. If shame withheld them from changing sides, much more ought it to have stopped him; who, from his superior education, must have been vastly more sensible to that kind of shame than the mean and illiterate fishermen of Galilee. The only other difference

^{Paul.} them, and sent them to preach whither the Holy Ghost should conduct them. And it was probably about this time, that is, about the year of Christ 44, that Paul being wrapt up into the third heaven, saw there ineffable things, and which were above the comprehension of man (2 Cor. xii. 2, 3, 4, and Acts xiii. 4, 5, 6, &c.)

Saul and Barnabas went first into Cyprus, where they began to preach in the synagogues of the Jews. When they had gone over the whole island, they there found a Jewish magician called Bar-jesus, who was with the proconsul Sergius Paulus; and who resisted them, and endeavoured to prevent the proconsul from embracing Christianity: whereupon St Paul struck him with blindness; by which miracle the proconsul, being an eye-witness of it, was converted to the Christian faith.

From this conversion, which happened at the city of Paphos, in the year of Christ 45, many think, that the apostle first began to bear the name of *Paul*, which St Luke always gives him afterwards, as is supposed in

memory of his converting Sergius Paulus. Some believe that he changed his name upon his own conversion; and Chrysostom will have this change to take place at his ordination, when he received his mission at Antioch; while others say, he took the name *Paul* only when he began to preach to the Gentiles: and, finally, several are of opinion, that he went by the names of both *Saul* and *Paul*, like many other Jews, who had one Hebrew name and another Greek or Latin one.

From the isle of Cyprus, St Paul and his company went to Perga in Pamphylia, where John Mark left them, to return to Jerusalem: but making no stay at Perga, they came to Antioch in Pisidia; where going into the synagogue, and being desired to speak, St Paul made them a long discourse, by which he showed, that Jesus Christ was the Messiah foretold by the prophets, and declared by John the Baptist; that he had been unjustly put to death by the malice and jealousy of the Jews; and that he rose again the third day. They heard him very attentively; and he was desired to discourse

was, that *they*, by quitting their Master after his death, might have preserved themselves; whereas *he*, by quitting the Jews, and taking up the cross of Christ, certainly brought on his own destruction.

As St Paul was not an impostor, so it is plain he was not an enthusiast. Heat of temper, melancholy, ignorance, and vanity, are the ingredients of which enthusiasm is composed; but from all these, except the first, the apostle appears to have been wholly free. That he had great fervour of zeal, both when a Jew and when a Christian, in maintaining what he thought to be right, cannot be denied; but he was at all times so much master of his temper, as, in matters of indifference, to "become all things to all men," with the most pliant condescension, bending his notions and manners to theirs, as far as his duty to God would permit; a conduct compatible neither with the stiffness of a bigot nor with the violent impulses of fanatical delusion. That he was not melancholy, is plain from his conduct in embracing every method which prudence could suggest to escape danger and shun persecution, when he could do it without betraying the duty of his office or the honour of his God. A melancholy enthusiast courts persecution; and when he cannot obtain it, afflicts himself with absurd penances: but the holiness of St Paul consisted only in the simplicity of a godly life, and in the unwearied performance of his apostolical duties. That he was ignorant, no man will allege who is not grossly ignorant himself; for he appears to have been master not only of the Jewish learning, but also of the Greek philosophy, and to have been very conversant even with the Greek poets. That he was not credulous, is plain from his having resisted the evidence of all the miracles performed on earth by Christ, as well as those that were afterward worked by the apostles; to the fame of which, as he lived in Jerusalem, he could not possibly have been a stranger. And that he was as free from vanity as any man that ever lived, may be gathered from all that we see in his writings, or know of his life. He represents himself as the least of the apostles, and not meet to be called an apostle. He says that he is the chief of sinners; and he prefers, in the strongest terms, universal benevolence to faith, and prophecy, and miracles, and all the gifts and graces with which he could be endowed. Is this the language of vanity or enthusiasm? Did ever fanatic prefer virtue to his own religious opinions, to illuminations of the spirit, and even to the merit of martyrdom?

Having thus shown that St Paul was neither an impostor nor an enthusiast, it remains only to be inquired, whether he was deceived by the fraud of others: but this inquiry needs not be long, for who was to deceive him? A few illiterate fishermen of Galilee? It was *morally* impossible for such men to conceive the thought of turning the most enlightened of their opponents, and the cruellest of their persecutors, into an apostle, and to do this by a fraud in the very instant of his greatest fury against them and their Lord. But could they have been so extravagant as to conceive such a thought, it was *physically* impossible for them to execute it in the manner in which we find his conversion to have been effected. Could they produce a light in the air, which at mid-day was brighter than the sun? Could they make Saul hear words from out of that light which were not heard by the rest of the company? Could they make him blind for three days after that vision, and then make scales fall off from his eyes, and restore him to sight by a word? Or, could they make him and those who travelled with him believe, that all these things had happened, if they had not happened? Most unquestionably no fraud was equal to all this.

Since then St Paul was neither an impostor, an enthusiast, nor deceived by the fraud of others, it follows, that his conversion was miraculous, and that the Christian religion is a divine revelation. See *J. Ytlington's Observations on the Conversion of St Paul*; a treatise to which it has been truly said, that infidelity has never been able to fabricate a specious answer, and of which this note is a very short and imperfect abridgement.

Paul. course again on the same subject the next Sabbath-day; and several, both Jews and Gentiles, followed them, to receive particular instructions more at leisure. On the Sabbath-day following, almost all the city met together to hear the word of God: but the Jews, seeing the concourse of people, were moved with envy at it; opposed, with blasphemies, what St Paul said; and not being able to bear the happy progress of the gospel in this country, they raised a persecution against the two apostles: whereupon Paul and Barnabas, shaking off the dust upon their feet against them, came from Antioch in Pisidia to Iconium. Being come thither, they preached in their synagogue, and converted a great number, both of Jews and Gentiles; and God confirmed their commission by a great number of miracles (Acts xiv. 1, 2, &c.) In the mean time, the unbelieving Jews, having incensed the Gentiles against Paul and Barnabas, and threatening to stone them, they were obliged to retire to Lystra and Derbe, cities of Lycaonia, where they preached the gospel. At Lystra, there was a man who had been lame from his mother's womb. This man fixing his eyes on St Paul, the apostle bid him rise, and stand upon his feet: whereupon he presently rose up, and walked; the people, seeing this miracle, cried out, that the gods were descended among them in the shape of men. They called Barnabas *Jupiter*, and Paul *Mercury*, because of his eloquence, and being the chief speaker. The priest of Jupiter brought also garlands and bulls before the gate, to offer sacrifices to them: but Paul and Barnabas tearing their clothes, and casting themselves into the middle of the multitude, cried out to them, Friends, what do you do? we are men as well as yourselves; and we are preaching to you to turn away from these vain superstitions, and to worship only the true God, who has made heaven and earth. But whatever they could say, they had much ado to restrain them from offering sacrifices to them.

In the mean time, some Jews of Antioch in Pisidia and of Iconium coming to Lystra, animated the people against the apostles. They stoned Paul, and drew him out of the city, thinking him to be dead. But the disciples gathering together about him, he rose up among them, entered again into the city, and the day after left it with Barnabas to go to Derbe. And having here preached the gospel also, they returned to Lystra, to Iconium, and to Antioch of Pisidia. Passing throughout Pisidia, they came to Pamphylia, and having preached the word of God at Perga, they went down into Attalia. From hence they set sail for Antioch in Syria, from whence they had departed a year before. Being arrived there, they assembled the church together, and told them the great things God had done by their means, and how he had opened to the Gentiles a door of salvation; and here they continued a good while with the disciples.

St Luke does not inform us of the actions of St Paul from the 45th year of Christ to the time of the council at Jerusalem, which was held in the 50th year of Christ. There is great likelihood that it was during this interval that St Paul preached the gospel from Jerusalem to Illyricum, as he informs us in his epistle to the Romans (xv. 19.); and this without making any stay in those places where others had preached before him. He does not acquaint us with

the particulars of these journeys, nor with the success of his preaching; but he says in general, that he had suffered more labours than any other, and had endured more prisons. He was often very near death itself, sometimes upon the water and sometimes among thieves. He run great dangers, sometimes from the Jews and sometimes among false brethren and perverse Christians; he was exposed to great hazards, as well in the cities as in the deserts: he suffered hunger, thirst, nakedness, cold, fastings, watchings (2 Cor. xi. 23—27.), and the fatigues inseparable from long journeys, which were undertaken without any prospect of human succour; in this very different from the good fortune of others who lived by the gospel, who received subsistence from those to whom they preached it, and who were accompanied always by religious women, who ministered to them in their necessary occasions. He made it a point of honour to preach gratis, working with his hands that he might not be chargeable to any one (1 Cor. ix. 1—15.); for he had learned a trade, as was usual among the Jews, which trade was to make tents of leather for the use of those that go to war (Acts xviii. 3.)

St Paul and St Barnabas were at Antioch when some persons coming from Judea (Acts xv. 1, 2, &c.) pretended to teach, that there was no salvation without circumcision, and without the observation of the other legal ceremonies. Epiphanius and Philaster say, that he that maintained this was Cerinthus and his followers. Paul and Barnabas withstood these new doctors; and it was agreed to send a deputation to the apostles and elders at Jerusalem about this question. Paul and Barnabas were deputed; and being arrived at Jerusalem, they reported to the apostles the subject of their commission. Some of the Pharisees that had embraced the faith, asserted, that the Gentiles that were converted ought to receive circumcision, and to observe the rest of the law. But the apostles and elders assembling to examine into this matter, it was by them decreed, that the Gentiles, who were converted to Christianity, should not be obliged to submit to the yoke of the law, but only to avoid idolatry, fornication, and the eating of things strangled, and blood.

St Paul and St Barnabas were then sent back to Antioch with letters from the apostles, which contained the decision of the question, and the resolution of that august assembly. The apostles also deputed Jude surnamed *Barsabas* and Silas, who were principal brethren, to go to Antioch with Paul and Barnabas to give their testimony also of what had been decreed at Jerusalem. Being arrived at Antioch, they assembled the faithful, read to them the apostles letter, and acquainted them, that it had been resolved to discharge them from the yoke of the ceremonial law. Some time after this, St Peter coming to Antioch and joining himself to the converted Gentiles, he lived with them without scruple; but some brethren happening to arrive there from Jerusalem, he separated himself from the Gentile converts, and did no longer eat with them: for which conduct St Paul publicly censured him (Gal. ii. 11—16.) St Paul (*id.* ii. 2, 3, &c.) in the same journey to Jerusalem declared openly to the faithful there the doctrine he preached among the Gentiles; and besides, discoursed of it in private among the chief of them in presence of Barnabas and Titus.

St

Paul.

St Peter, St James, and St John, with whom he had these conversations, could find nothing either to be added or amended in so pure and so sound a doctrine and demeanour. They saw with joy the grace that God had given him; they acknowledged that he had been appointed the apostle of the Gentiles, as St Peter had been of the circumcision. They concluded that Paul and Barnabas should continue to preach among the Gentiles; and only recommended to them to take care concerning the collections for the poor; that is to say, to exhort the converted Christians among the Gentiles, to assist the faithful brethren in Judea, who were in necessity; whether it were because they had sold and distributed their goods, or because they had been taken away from them (Heb. x. 54.)

After Paul and Barnabas had continued some days at Antioch, St Paul proposed to Barnabas to return and visit the brethren through all the cities wherein they had planted the gospel, to see in what condition they were. Barnabas consented to the proposal; but insisted upon taking John Mark along with them. This was opposed by Paul, which produced a separation between them. Barnabas and John Mark went together to Cyprus; and St Paul, making choice of Silas, crossed over Syria and Cilicia, and came to Derbe, and afterwards to Lystra (Acts xvi. 1, 2, &c.) Here they found a disciple called *Timothy*, whom St Paul took with him, and circumcised him that he might not offend the Jews of that country. When therefore they had gone over the provinces of Lycaonia, Phrygia, and Galatia, the Holy Ghost would not allow them to preach the gospel in the proconsular Asia, which contained Ionia, Æolia, and Lydia. They therefore went on to Mysia, and coming to Troas, St Paul had a vision in the night. A man, habited like a Macedonian, presented himself before him, and said, Pass into Macedonia and come and succour us. Immediately he set out on this journey, not doubting but that God had called him into this country.

Embarking therefore at Troas, they sailed to Neapolis. Thence they came to Philippi, where upon the sabbath-day they went near the river side, where the Jews had a place of devotion, and where they found some religious women, among whom was Lydia, who was converted and baptized, and invited the apostle and his company to lodge at her house. Another day, as they went to the same place of devotion, they happened to meet a maid servant possessed with a spirit of divination, who followed St Paul and his company, crying out, that these men were the servants of the most high God, who declared to the world the way of salvation. This she did for several days together; at last St Paul, turning himself towards her, said to the spirit, I command thee in the name of Jesus Christ to come out of the body of this woman: upon which it immediately left her. But the masters of this damsel, who made much money by her, drew Paul and Silas before the magistrates, and accused them of attempting to introduce a new religion into the city. For this the magistrates ordered them to be whipt with rods upon the back and shoulders, and afterwards sent them to prison.

Towards midnight, as Paul and Silas were singing hymns and praises to God, on a sudden there was a great earthquake, so that the foundations of the pri-

son were shaken, and all the doors flew open at the same time, and the fetters of the prisoners burst asunder. The gaoler being awakened at this noise, and seeing all the doors open, he drew his sword with an intention to kill himself, imagining that all the prisoners had made their escape. But Paul cried out to him, that he should do himself no mischief, for they were all safe. Then the gaoler entering and finding all the prisoners there, he brought out Paul and Silas from this place, asking them what he must do to be saved? Paul and Silas instructing him and all his family, gave them baptism. After this the gaoler set before them something to eat; and when the morning was come, the magistrates sent him word that he might release his prisoners, and let them go about their business. But Paul returned this answer to the magistrates; Ye have publicly whipped us with rods, being Roman citizens; ye have thrown us into prison; and now ye would privately dismiss us: But it shall not be so, for you yourselves shall come to fetch us out. The magistrates hearing that they were Roman citizens, came to excuse themselves; and having brought them out of prison, they desired them to depart out of their city. Paul and Silas went first to the house of Lydia, where having visited and comforted the brethren, they departed from Philippi.

Then passing through Amphipolis and Apollonia, they came to Thessalonica the capital city of Macedonia, where the Jews had a synagogue (Acts xvii. 1, &c.) Paul entered therein, according to his custom, and there preached the gospel to them for three Sabbath-days successively. Some Jews and several proselytes believed in Jesus Christ, and united themselves to Paul and Silas: but the greatest part of the Jews being led away by a false zeal, raised a tumult in the city, and went to the house of Jason where St Paul lodged. But not finding him there, they took Jason and led him before the magistrates, where they accused him of harbouring in his house people that were disobedient to the ordinances of the emperor, and who affirmed that there was another king besides him, one Jesus whom they preached up. But Jason having given security to answer for the people who were accused, he was dismissed to his own house; and the night following the brethren conducted Paul and Silas out of the city, who went to Berea, where they began to preach in the synagogue. The Jews of Berea heard them gladly, and many of them were converted; as also several of the Gentiles and many women of distinction that were not Jewesses.

The Jews of Thessalonica being informed that Paul and Silas were at Berea, came thither and animated the mob against them; so that St Paul was forced to withdraw, leaving Silas and Timothy at Berea to finish the work he had so happily begun. Those who conducted St Paul embarked along with him, and brought him as far as Athens (Theod. in 1 Thessal.), where he arrived in the fifty-second year of Jesus Christ. As soon as he was got thither, he sent back those that had brought him, with orders to tell Silas and Timothy, that he desired them to follow him to Athens as soon as possible. In the mean time, he went into a synagogue of the Jews and preached to them as often as he had opportunity; and disputing with the philosophers who were frequent in that place, they

Paul.

Paul. they at last brought him before the Areopagus, accusing him of introducing a new religion. St Paul being come before the judges, pleaded in his own defence, that among other marks of superstition which he had found in that city, he had observed an altar inscribed, "To the unknown God." It was therefore this God whom they confessed that they knew not, that he came to make known to them. Afterwards he spoke to them of God the creator of heaven and earth, of the superintendence of a providence, of the last judgment, and of the resurrection of the dead. But after they had heard of the resurrection, some made scorn of him, and others desired to hear him another time. However some of them embraced the Christian faith, of which number was Dionysius a senator of the Areopagus, and a woman called *Damaris*, and several others with them.

St Timothy came from Berea to Athens according to the request of St Paul, and informed him of the persecution with which the Christians of Thessalonica were then afflicted. This obliged the apostle to send him into Macedonia, that he might comfort them and keep them steadfast (1 Thessal. iii. 1, 2, &c.) After this St Paul left Athens and went to Corinth, where he lodged with one Aquila a Jew, and by trade a tent-maker (Acts xviii. 1, 2, &c.) With this Aquila the apostle worked, as being of the same trade himself. But, however, he did not neglect the preaching of the gospel, which he performed every day in the synagogue; showing both to the Jews and Gentiles that Jesus was the Messiah. There he made several converts; and he tells us himself (1 Cor. i. 14—17. and xvi. 15.) that he baptized Stephanus and his whole house, with Crispus and Gaius. About the same time Silas and Timothy came to Corinth, and acquainted him with the good state of the faithful at Thessalonica; and soon after this, he wrote his first epistle to the Thessalonians, which is the first of all the epistles that he wrote; and not long after he wrote his second epistle to that church.

St Paul, now finding himself encouraged by the presence of Silas and Timothy, went on with the work of his ministry with new ardour, declaring and proving that Jesus Christ was the true Messiah. But the Jews opposing him with blasphemous and opprobrious words, he shook his clothes at them, and said, "Your blood be upon your own head; from henceforth I shall go to the Gentiles." He then quitted the house of Aquila, and went to lodge with one Titus Justus, who was originally a Gentile, but one that feared God. In the mean time the Lord appeared to St Paul in a vision, told him, that in Corinth he had much people; and this was the reason why the apostle continued there eight months.

But Gallio the pro-consul of Achaia being at Corinth, the Jews of that city rose up against Paul and carried him before Gallio, accusing him of attempting to introduce a new religion among them: however, Gallio sent them away, telling them he would not meddle with disputes that were foreign to his office. Paul continued some time longer at Corinth; but at last he set out for Jerusalem, where he had a mind to be present at the feast of Pentecost. Before he went on shipboard, he cut off his hair at Cenchrea, because

he had completed his vow of Nazariteship, in which he had engaged himself. He arrived at Ephesus with Aquila and Priscilla, from whence he went to Caesarea of Palestine, and thence to Jerusalem. Here having performed his devotions, he came to Antioch, where he stayed some time; and then passing from thence, he made a progress through all the churches of Galatia and Phrygia successively; and having gone over the higher provinces of Asia, he returned to Ephesus, where he abode three years; that is, from the year of Christ 54 to the year 57 (Acts xix. 1, 2, &c.)

St Paul having arrived at Ephesus, he found there some disciples that had been initiated by Apollos, who had only baptized them with the baptism of John. St Paul instructed them, baptized them with the baptism of Jesus Christ, and laid his hands on them; whereupon they received the Holy Ghost, the gifts of languages and of prophecy. The apostle afterwards went into the synagogue, and preached to the Jews for three months, endeavouring to convince them that Jesus Christ was the Messiah: but as he found them very obstinate, he separated himself from them, and taught daily in the school of one Tyrannus. He performed there several miracles, infomuch, that the linen that had but touched his body, being afterwards applied to the sick, they were presently cured of their diseases, or delivered from the devils that possessed them. He also suffered much there, as well from the Jews as from the Gentiles; and he himself informs us (1 Cor. xv. 31, 32.), that after the manner of men he fought with beasts at Ephesus; that is to say, that he was exposed to wild beasts in the amphitheatre, so that it was expected he should have been devoured by them; but God miraculously delivered him: though some are of opinion, that the fight here mentioned by St Paul was nothing else but the scuffle he had with Demetrius the silver-smith and his companions, who were disappointed in their attempt of putting the apostle to death. It was during his abode at Ephesus that the apostle wrote his epistle to the Galatians.

After this St Paul proposed, at the instigation of the Holy Ghost, to pass through Macedonia and Achaia, and afterwards to go to Jerusalem, saying, that after he had been there, he must also see Rome; and having sent Timothy and Erastus before to Macedonia, he tarried some time in Asia. During this time, he received intelligence that domestic troubles had risen in the church of Corinth, and that abuses had begun to creep in; which made him resolve to write his first epistle to that church.

Soon after this, taking leave of the disciples, he departed for Macedonia (Acts xx. 1, 2, &c.) He embarked at Troas, took Timothy with him, and together passed into Macedonia (2 Cor. ii. 12 and vii. 5—15.) Titus came thither to him, and acquainted him with the good effects that his letter had produced among the Corinthians; and told him, that the collections that had been made by the church of Corinth for the faithful in Palestine were now ready; which engaged Paul to write a second letter to the Corinthians. St Paul, having passed through Macedonia, came into Greece or Achaia, and there continued three months. He visited the faithful of Corinth; and

Paul.

Paul. and having received their alms, as he was upon the point of returning into Macedonia, he wrote his epistle to the Romans.

At last he left Greece and came into Macedonia, in the year of Christ 58, intending to be at Jerusalem at the feast of Pentecost. He staid some time at Philippi, and there celebrated the feast of the passover. From hence he embarked and came to Troas, where he continued a week. On the first day of the week the disciples being assembled to break bread, as St Paul was to depart the day following, he made a discourse to them which held till midnight. During this time a young man called Eutychus, happening to sit in a window and fall asleep, fell down three stories high, and was killed by the fall. St Paul came down to him, and embraced him, and restored him to life again. Then he went up again, broke bread and eat it, and continued his discourse till day-break, at which time he departed. Those of his company took ship at Troas; but as for himself he went on foot as far as Assos, otherwise called *Apollonia*, and then embarked along with them at Mitylene. From hence he came to Miletus, whither the elders of the church of Ephesus came to see him; for he had not time to go to them, because he was desirous of being at Jerusalem at the feast of Pentecost.

When these elders were arrived at Miletus, St Paul discoursed with them, and told them that he was going to Jerusalem without certainly knowing what should happen to him; however he did not doubt but that he had much to suffer there, since in all cities the Holy Ghost had given him to understand, that chains and afflictions waited for him at Jerusalem. Nevertheless, he declared to them, that all this did not terrify him, provided he could but fulfil his ministry. After having exhorted them to patience, and having prayed along with them, he went on board, going straight to Coos, then to Rhodes, and thence to Patara (*Acts* xxi. 1, 2, &c.), where finding a ship that was bound for Phœnicia, they went on board and arrived safe at Tyre. Here they made a stop for seven days, and then going on, they arrived at Ptolemais, and thence at Cæsarea, where they found Philip the evangelist, who was one of the seven deacons. While St Paul was there, the prophet Agabus arrived there also from Judea; and having taken St Paul's girdle, he bound his own hands and feet with it, saying, "Thus shall the Jews of Jerusalem bind the man that owns this girdle, and shall deliver him up to the Gentiles." But St Paul's constancy was not shaken by all these predictions, and he told them, that he was ready, not only to suffer bonds, but death itself, for the name of Christ.

When he was come to Jerusalem, the brethren received him with joy; and the day following he went to see St James the less, bishop of Jerusalem, at whose house all the elders assembled. Paul gave them an account of what God had done among the Gentiles by his ministry. Then St James informed him, that the converted Jews were strangely prejudiced against him, because they were informed he taught the Jews that lived among the Gentiles and out of Palestine, that they ought to renounce the law of Moses, and no longer circumcise their children. Therefore, continued St James, we must assemble them here together, where

you may speak to them yourself, and undeceive them. Moreover do this, that your actions may verify your words: join yourself to four men that are here, and who have taken upon them a vow of Nazariteship; and that you may share in the merit of their action, contribute to the charge of their purification, and purify yourself also, that you may offer with them the offerings and sacrifices ordained for the purification of a Nazarite. See NAZARITE.

St Paul exactly followed this advice of St James, and on the next day went into the temple, where he declared to the priests, that in seven days these four Nazarites would complete their vow of Nazariteship; and that he would contribute his share of the charges. But towards the end of these seven days, the Jews of Asia having seen him in the temple, moved all the people against him, laid hold of him, and cried out, "Help, ye Israelites, this is he that teaches every where against the law, and against the temple, and has brought Gentiles into the temple, and profaned this holy place." At the same time they laid hold on him, shut the gates of the temple, and would have killed him, had not Lyfias the tribune of the Roman garrison there run to his rescue, taken him out of their hands, and brought him into the citadel. St Paul being upon the steps, desired the tribune to suffer him to speak to the people, who followed him thither in a great multitude. The tribune permitted him, and St Paul, making a sign with his hand, made a speech in Hebrew (*Acts* xxii.), and related to them the manner of his conversion, and his mission from God to go and preach to the Gentiles. At his mentioning the Gentiles, the Jews began to cry out, "Away with this wicked fellow out of the world, for he is not worthy to live."

Immediately the tribune made him come into the castle, and ordered that he should be examined by whipping him, in order to make him confess the matter why the Jews were so incensed against him. Being now bound, he said to the tribune, "Is it lawful for you to whip a Roman citizen before you hear him?" The tribune hearing this, caused him to be unbound, and calling together the priests and the senate of the Jews, he brought Paul before them, that he might know the occasion of this tumult of the people. Then Paul began to speak to them to this purpose, (*Acts* xxiii.): "Brethren, I have lived in all good conscience before God until this day." At which words, Ananias, son of Nebedeus, who was the chief-priest, ordered the by-standers to give him a blow in the face. At which St Paul said to him, "God shall smite thee, thou whited wall; for fittest thou to judge me after the law, and commandest me to be smitten contrary to the law?" Those that were present said to him, "Revilest thou God's high-priest?" St Paul excused himself by saying, that he did not know he was the high-priest, "For it is written, thou shalt not speak evil of the ruler of thy people." Then perceiving that part of the assembly were Sadducees and part Pharisees, he cried out, "Brethren, I am a Pharisee, the son of a Pharisee; of the hope and resurrection of the dead I am called in question."

Then the assembly being divided in interests and opinion, and the clamour increasing more and more, the tribune ordered the soldiers to fetch him away out

Paul. of the assembly, and bring him into the castle. The following night the Lord appeared to Paul, and said to him, "Take courage, for as you have bore testimony of me at Jerusalem, so must you also at Rome." The day following, more than 40 Jews engaged themselves by an oath, not to eat or drink till they had killed Paul. They came, therefore, and made known their design to the priests and chiefs of the people, saying to them, "To-morrow cause Paul to appear before you, as if you would inquire more accurately into his affair, and before he can come to you, we will lie in wait for him and kill him." But St Paul, being informed of this conspiracy by his sister's son, acquainted the tribune with it; who gave orders that the night following he should be sent to Cæsarea, to Felix the governor, who had his ordinary residence there. Felix having received letters from Lyfias, and being informed that St Paul was of Cilicia, he told him he would hear him when his accusers should arrive.

Five days after, Ananias the high-priest and some of the senators came to Cæsarea, bringing with them Tertullus the orator, to plead against Paul. Tertullus accused him of being a seditious person, a disturber of the public peace; one who had put himself at the head of a sect of Nazarenes, and who made no scruple even to profane the temple, (*id.* xxiv.) But St Paul easily refuted these calumnies, and defied his accusers to prove any of the articles they had exhibited against him: he ended his discourse by saying, "That for the doctrine of the resurrection from the dead, his adversaries would have him condemned." Felix put off the further hearing of this cause till another time; and, some days afterwards, came himself with his wife Drusilla to hear Paul; and being in hopes that the apostle would purchase his freedom with a sum of money, he used him well, often sent for him, and had frequent conversations with him.

Two years having passed thus away, Felix made way for his successor Portius Festus; but being willing to oblige the Jews, he left Paul in prison. Festus being come to Jerusalem, the chief priests desired to send for Paul, with a design to fall upon him by the way. But Festus told them, they might come to Cæsarea, where he would do them justice. Hither the Jews came, and accused Paul of several crimes, of which they were able to prove nothing, (*id.* xxv.) Festus then proposed to the apostle to go to Jerusalem, and be tried there; but he answered, "That he was now at the emperor's tribunal, where he ought to be tried; and that he appealed to Cæsar:" whereupon Festus, having conferred with his council, told him, that therefore to Cæsar he should go.

Some days after, King Agrippa and his wife Berenice coming to Cæsarea, desired to hear Paul; who pleaded his cause with such ability, that Agrippa exclaimed, "Almost thou persuadest me to be a Christian." See AGRIPPA.

As soon, therefore, as it was resolved to send Paul into Italy, he was put on board a ship at Adramyttium, a city of Mysia; and having passed over the seas of Cilicia and Pamphylia, they arrived at Myra in Lycia, where, having found a ship that was bound for Italy, they went on board, (*id.* xxvii.) But the season being far advanced (for it was at least the latter end of Septem-

ber), and the wind proving contrary, they with much difficulty arrived at the Fair Haven, a port in the isle of Crete. St Paul advised them to winter there: however, others were of opinion they had better go to Phe-nice, another harbour of the same island; but as they were going thither, the wind drove them upon a little island called *Clauda*, where the mariners, fearing to strike upon some bank of sand, they lowered their mast, and surrendered themselves to the mercy of the waves. Three days after this, they threw overboard the tackling of the ship. Neither sun nor stars had appeared now for 14 days. In this extreme danger, an angel appeared to St Paul, and assured him, that God had given him the lives of all that were in the ship with him; which were in all 276 souls. St Paul told them of his vision, exhorted them to take courage, and promised them that they should all come alive into an island; and that the vessel only should be lost. On the 14th night the seamen cast out the lead, and thought by their sounding that they approached near to some land. They were attempting to save themselves by going into the boat; but St Paul told the centurion and the soldiers, that except the sailors continued in the ship, their lives could not be saved. Then the soldiers cut the ropes of the boat, and let her drive. About day-break, St Paul persuaded them to take some nourishment, assuring them that not a hair of their heads should perish. After his example, they took some food, and when they had eat, they lightened their vessel, by throwing the corn into the sea. Day being come, they perceived a shore, where they resolved, if possible, to bring the ship to. But the vessel having struck against a neck of land that run out into the sea, so that the head remained fixed, and the stern was exposed to the mercy of the waves; the soldiers, fearing lest any of the prisoners should make their escape by swimming, were for putting them all to the sword. But the centurion would not suffer them, being willing to save Paul; and he commanded those that could swim to throw themselves first out of the vessel; and the rest got planks, so that all of them came safe to shore. Then they found that the island was called *Melita* or *Malta*; the inhabitants of which received them with great humanity, (*Acts* xxvii. 1, 2, 3, &c.)

They being all very wet and cold, a great fire was lighted to dry them; and Paul having gathered up a handful of sticks, and put them upon the fire, a viper leaped out of the fire, and took hold of his hand. Then the barbarous people said to one another, "Without doubt this man is a murderer; and though he has been saved from the shipwreck, yet divine vengeance still pursues him, and will not suffer him to live." But Paul, shaking the viper into the fire, received no injury from it. The people, seeing this, changed their opinion of him, and took him for a god; which opinion of theirs was more confirmed, by his curing the father of Publius, the chief man of the island, of a fever and bloody-flux. After this miracle, they all brought out their sick to him, and they were healed. See MELITA.

At the end of three months they embarked again; and arrived, first at Syracuse, then at Rhegium, and lastly at Puteoli. Here St Paul found some Christians, who detained him for seven days; then he set out for Rome. The brethren of this city, having been in-

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formed of St Paul's arrival, came out to meet him as far as Appii-forum, and the Three Taverns. And when he was come to Rome, he was allowed to dwell where he pleased, having a soldier to guard him, who was joined to him with a chain. Three days afterwards, St Paul desired the chief of the Jews there to come to him. He related to them in what manner he had been seized in the temple of Jerusalem, and the necessity he was under of appealing to Cæsar. The Jews told him, that as yet they had received no information about his affair; and, as for Christianity, they knew nothing of it, but only that it was spoken against everywhere; however, that they should be very willing to have some account of that doctrine from him. A day was appointed for this purpose; when St Paul preached to them concerning the kingdom of God, endeavouring to convince them from Moses and the prophets, that Jesus was the Messiah. Some of them believed what he had said to them, while others disbelieved; so that they returned from him divided among themselves.

Paul dwelt for two whole years at Rome, from the year of Christ 61 to the year 63, in a lodging that he hired; where he received all that came to him, preaching the kingdom of God, and the religion of Jesus Christ, without any interruption.

Hitherto we have had the Acts of the Apostles for our guide, in compiling the history of St Paul; what we shall add hereafter, will be mostly taken from his own Epistles. His captivity did not a little contribute to the advancement of religion; for he converted several persons even of the emperor's court, (Philip. i. 12—18. and iv. 22.) The Christians of Philippi, in Macedonia, hearing that St Paul was a prisoner at Rome, sent Epaphroditus their bishop to him, to bring him money, and otherwise to assist him in their name, (Phil. ii. 25.) Epaphroditus fell sick at Rome; and when he went back to Macedonia, the apostle sent by him his Epistle to the Philippians.

It is not known by what means St Paul was delivered from his prison, and discharged from the accusation of the Jews. There is great probability that they durst not appear against him before the Emperor, as not having sufficient proof of what they laid to his charge. However that may be, it is certain that he was set at liberty, after having been two years a prisoner at Rome. He wrote also, during this imprisonment, his Epistles to Philemon and the Colossians.

He was still in the city Rome, or at least in Italy, when he wrote his Epistle to the Hebrews. St Paul, having got out of prison, went over Italy; and, according to some of the fathers, passed into Spain; then into Judea; went to Ephesus, and there left Timothy (Heb. xiii. 24. and 1 Tim. i. 3.); preached in Crete, and there fixed Titus, to take care to cultivate the church he had planted in that place. Probably he might also visit the Philippians, according to the promise he had made them, (Phil. i. 23, 26. and ii. 24.); and it is believed, that it was from Macedonia that he wrote the First Epistle to Timothy.—Some time after, he wrote to Titus, whom he had left in Crete; he desires him to come to Nicopolis, from whence, probably, he sent this letter. The year following, that is, the 63th year of the Christian era, the apostle went into Asia, and came to Troas, (2 Tim.

iv. 13.) Thence he went to visit Timothy at Ephesus, and from that to Miletus, (2 Tim. iv. 20.) Lastly, he went to Rome; and St Chrysostom says, that it was reported, that having converted a cup-bearer and a concubine of Nero, this so provoked the Emperor, that he caused St Paul to be apprehended, and clapped into prison. It was in this last place of confinement that he wrote his Second Epistle to Timothy, which Chrysostom looks upon as the apostle's last testament. See TIMOTHY and TITUS.

This great apostle at last consummated his martyrdom, the 29th of June, in the 66th year of Jesus Christ, by having his head cut off, at a place called the *Salvian Waters*. He was buried on the way of Ostium, and a magnificent church was built over his tomb, which is in being to this day. *Calmei's Dict. &c.*

PAUL (St), *Cave or Grotto of*, in the island of Malta, where St Paul and his company took shelter from the rains, when the viper fastened on his arm. Upon this spot there is a church built by the famed Alof de Vignacourt, grand-master of the order, in the year 1606, a very handsome, though but a small, structure. On the altar piece is a curious painting, representing the apostle's shaking off the viper, surrounded with men, women, and children, in attitudes of admiration and surprise, and in the old Maltese garb; and the whole very well executed. On the top of the painting is the following inscription:

Vipera ignis acta calore frustra Pauli
Manum invadit; is insulæ benedicens
Anguibus & herbis adimit omne virus.
M.DC.V.

PAUL, first bishop of Narbonne, or Sergius Paulus the proconsul, converted and made bishop by St Paul, was descended from one of the best families of Rome. It is said the apostle called himself *Paul*, from his name. The Spaniards will have him to be their apostle, which is not improbable; and it is said he died a martyr at Narbonne.

PAUL V. by birth a Roman, was first clerk of the chamber, and afterwards nuncio to Clement VIII. in Spain, who honoured him with a cardinal's hat. He was advanced to the papal chair the 16th of May 1605, after Leo XI. The ancient quarrel between the secular and ecclesiastical jurisdictions, which in former times had occasioned so much bloodshed, revived in the reign of this pontiff. The senate of Venice had condemned by two decrees, 1. The new foundations of monasteries made without their concurrence. 2. The alienation of the estates both ecclesiastical and secular. The first decree passed in 1603, and the second in 1605. About the same time a canon and abbot, accused of rapine and murder, were arrested by order of the senate, and delivered over to the secular court; a circumstance which could not fail to give offence to the court of Rome. Clement VIII. thought it proper to dissemble or take no notice of the affair; but Paul V. who had managed the Genoese upon a similar occasion, flattered himself with the hopes that the Venetians would be equally pliant. However, he was disappointed; for the senate maintained that they held their power to make laws of God only; and therefore they refused to revoke their decrees and deliver up the ecclesiastical

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Paul. ecclesiastical prisoners into the hands of the nuncio, as the pope demanded. Paul, provoked at this behaviour, excommunicated the doge and senate; and threatened to put the whole state under an interdict, if satisfaction was not given him within the space of 24 hours. The senate did no more than protest against this menace, and forbid the publication of it throughout their dominions. A number of pamphlets, from both sides, soon announced the animosity of the two parties. The Capuchins, the Thealins, and Jesuits, were the only religious orders who observed the interdict. The senate shipped them all off for Rome, and the Jesuits were banished for ever. Meantime his holiness was preparing to make the refractory republic submit to his spiritual tyranny by force of arms. He levied troops against the Venetians; but he soon found his design balked, as the cause of the Venetians appeared to be the common cause of all princes. He had recourse, therefore, to Henry IV. to settle the differences; and this prince had all the honour of bringing about a reconciliation between the contending parties. His ambassadors at Rome and Venice began the negotiation, and Cardinal de Joyeuse finished it in 1607. It was agreed upon, that this cardinal should declare at his entry into the senate, that the censures of the church were to be taken off, or that he would remove them; and that the doge should at the same time surrender to him the deeds of revocation and protest. It was also stipulated, that all the religious who were banished, except the Jesuits, should be restored to their former privileges. In fine, the Venetians promised to send an ambassador extraordinary to Rome, in order to thank the pope for the favour he had done them; but they would not allow the legate to speak of his holiness granting them absolution. Paul was wise enough to overlook the whole matter, but endeavoured to put an end to another dispute, which had been long agitated in the congregations *de auxiliis*. He caused it to be intimated in form to the disputants and counsellors, that, as the congregations were now dissolved, it was his express order that the contending parties should no longer continue to censure one another. Some authors have affirmed that Paul V. had drawn out a bull against the doctrine of Molina, which only wanted to be promulged; but for this fact there appears to be no other evidence than the draught of this bull, which we meet with in the end of the history of the above-mentioned congregations. Paul was strongly solicited, but in vain, to make the *immaculate conception of the holy virgin* an article of faith. He contented himself with barely forbidding the contrary doctrine to be publicly taught, that he might not offend the Dominicans, who, at that time, maintained that she was conceived, like other human creatures, in original sin. His holiness afterwards applied himself to the embellishing of Rome, and was at great pains to collect the works of the most eminent painters and engravers. Rome is indebted to him for its most beautiful fountains, especially that where the water spouts out from an antique vase taken from the thermæ or hot-baths of Vespasian, and that which they call *aqua Paola*, an ancient work of Augustus, restored by Paul V. He brought water into it by an aqueduct 35 miles in length, after the example of Sixtus V. He completed the frontispiece of St Peter,

and the magnificent palace of Mount Cavallo. He applied himself in a particular manner to the recovering and repairing ancient monuments, which he made to advance, as much as the nature of them would admit, the honour of Christianity; as appears from an elegant inscription placed upon a column of porphyry, taken from the temple of Peace, and bearing a beautiful statue of the Virgin, at the side of the church of St Mary the elder:

“ Impura falsi templa
Quondam numinis
Jubente moesta perferebam Cæsare :
Nunc læta veri
Perferens matrem Dei
Te, Paule, nullis obticebo sæculis.”

His pontificate was honoured with several illustrious embassies. The kings of Japan, Congo, and other Indian princes, sent ambassadors to him. He took care to supply them with missionaries, and to found bishopricks in these countries newly brought over to the faith. He showed the same attention to the Maronites and other eastern Christians. He sent legates to different orthodox princes, both to testify his esteem for them, and to confirm them in their zeal for religion. He died the 28th of January 1621, aged 69; after having confirmed the French Oratory, the Ursulines, the Order of Charity, and some other institutions. Bold in his claims, but of narrow views, he distinguished himself more by his piety and knowledge than by his politics. It has been remarked, that he never passed a single day of his popedom without celebrating mass. He enjoined all the religious in the prosecution of their studies to have regular professors for Latin, Greek, Hebrew, and Arabic; if there were any among themselves properly qualified; or if that was not the case, to take the assistance of laymen for that purpose, until there were some of their own order who had learning enough to instruct their brethren. It was very difficult to carry this decree into execution; and indeed it was always very imperfectly observed.

PAUL (Father), whose name, before he entered into the monastic life, was Peter Sarpi, was born at Venice, August 14. 1552. His father followed merchandise, but with so little success, that at his death he left his family very ill provided for: but under the care of a mother whose piety was likely to bring the blessing of providence upon them, and whose wife conducted supplied the want of fortune by advantages of greater value. Happily for young Sarpi she had a brother, master of a celebrated school, under whose direction he was placed by her. Here he lost no time, but cultivated his abilities, naturally of the first rate, with unwearied application. He was born for study, having a natural aversion to pleasure and gaiety, and a memory so tenacious that he could repeat 30 verses upon once hearing them. Proportionable to his capacity was his progress in literature: at 13, having made himself master of school learning, he turned his studies to philosophy and the mathematics, and entered upon logic under Capella of Cremona, who, though a celebrated master of that science, confessed himself in a very little time unable to give his pupil any farther instructions.

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As Capella was of the order of the Servites, his scholar was induced by his acquaintance with him to engage in the same profession, though his uncle and his mother represented to him the hardships and austerities of that kind of life, and advised him with great zeal against it. But he was steady in his resolutions, and in 1566 took the habit of the order, being then only in his 14th year, a time of life in most persons very improper for such engagements, but in him attended with such maturity of thought, and such a settled temper, that he never seemed to regret the choice he then made, and which he confirmed by a solemn public profession in 1572.

At a general chapter of the Servites held at Mantua, Paul (for so we shall now call him) being then only 20 years old, distinguished himself so much in a public disputation by his genius and learning, that William duke of Mantua, a great patron of letters, solicited the consent of his superiors to retain him at his court, and not only made him public professor of divinity in the cathedral, and reader of casuistical divinity and canon law in that city, but honoured him with many proofs of his esteem. But Father Paul finding a court life not agreeable to his temper, quitted it two years afterwards, and retired to his beloved privacies, being then not only acquainted with the Latin, Greek, Hebrew, and Chaldee languages, but with philosophy, the mathematics, canon and civil law, all parts of natural philosophy, and chemistry itself; for his application was unintermitted, his head clear, his apprehension quick, and his memory retentive.

Being made a priest at 22, he was distinguished by the illustrious Cardinal Borromeo with his confidence, and employed by him on many occasions, not without the envy of persons of less merit, who were so far exasperated as to lay a charge against him before the Inquisition, for denying that the Trinity could be proved from the first chapter of Genesis; but the accusation was too ridiculous to be taken notice of. After this he passed successively through the dignities of his order, of which he was chosen provincial for the province of Venice at 26 years of age; and discharged this post with such honour, that in 1579 he was appointed, with two others, to draw up new regulations and statutes for his order. This he executed with great success; and when his office of provincial was expired, he retired for three years to the study of natural and experimental philosophy and anatomy, in which he is said to have made some useful discoveries. In the intervals of his employment he applied himself to his studies with so extensive a capacity, as left no branch of knowledge untouched. By him Acquapendente, the great anatomist, confesses that he was informed how vision is performed; and there are proofs that he was not a stranger to the circulation of the blood. He frequently conversed upon astronomy with mathematicians, upon anatomy with surgeons, upon medicine with physicians, and with chemists upon the analysis of metals, not as a superficial inquirer, but as a complete master. He was then chosen procurator general of his order; and during his residence at Rome was greatly esteemed by Pope Sixtus V. and contracted an intimate friendship with Cardinal Bellarmine and other eminent persons.

But the hours of repose, that he employed so well,

were interrupted by a new information in the Inquisition; where a former acquaintance produced a letter written by him in cyphers, in which he said, "that he detested the court of Rome, and that no preferment was obtained there but by dishonest means." This accusation, however dangerous, was passed over on account of his great reputation; but made such impressions on that court, that he was afterwards denied a bishopric by Clement VIII. After these difficulties were surmounted, F. Paul again retired to his solitude; where he appears, by some writings drawn up by him at that time, to have turned his attention more to improvements in piety than learning. Such was the care with which he read the scriptures, that, it being his custom to draw a line under any passage which he intended more nicely to consider, there was not a single word in his New Testament but was underlined. The same marks of attention appeared in his Old Testament, Psalter, and Breviary.

But the most active scene of his life began about the year 1615; when Pope Paul V. exasperated by some decrees of the senate of Venice that interfered with the pretended rights of the church, laid the whole state under an interdict. The senate, filled with indignation at this treatment, forbade the bishops to receive or publish the pope's bull; and, convening the rectors of the churches, commanded them to celebrate divine service in the accustomed manner, with which most of them readily complied: but the Jesuits and some others refusing, were by a solemn edict expelled the state. Both parties having proceeded to extremities, employed their ablest writers to defend their measures. On the pope's side, among others, Cardinal Bellarmine entered the lists, and, with his confederate authors, defended the papal claims with great scurrility of expression, and very sophistical reasonings; which were confuted by the Venetian apologists in much more decent language, and with much greater solidity of argument. On this occasion F. Paul was most eminently distinguished by his *Defence of the Rights of the supreme Magistrate*, his *Treatise of Excommunication*, translated from Gerson, with an *Apology*, and other writings; for which he was cited before the Inquisition at Rome: but it may be easily imagined that he did not obey the summons.

The Venetian writers, whatever might be the abilities of their adversaries, were at least superior to them in the justice of their cause. The propositions maintained on the side of Rome were these: That the pope is invested with all the authority of heaven and earth: that all princes are his vassals, and that he may annul their laws at pleasure: that kings may appeal to him, as he is temporal monarch of the whole earth: that he can discharge subjects from their oaths of allegiance, and make it their duty to take up arms against their sovereign: that he may depose kings without any fault committed by them, if the good of the church requires it: that the clergy are exempt from all tribute to kings, and are not accountable to them even in cases of high-treason: that the pope cannot err: that his decisions are to be received and obeyed on pain of sin, though all the world should judge them to be false: that the pope is God upon earth: that his sentence and that of God are the same: and that to call his power in question is to call in question the power of God: maxims equally shocking, weak,

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Paul. weak, pernicious, and absurd; which did not require the abilities or learning of F. Paul to demonstrate their falsehood and destructive tendency. It may be easily imagined that such principles were quickly overthrown, and that no court but that of Rome thought it for its interest to favour them. The pope, therefore, finding his authors confuted and his cause abandoned, was willing to conclude the affair by treaty; which, by the mediation of Henry IV. of France, was accommodated upon terms very much to the honour of the Venetians. But the defenders of the Venetian rights were, though comprehended in the treaty, excluded by the Romans from the benefit of it: some, upon different pretences, were imprisoned; some sent to the galleys; and all debarred from preferment. But their malice was chiefly aimed against F. Paul, who soon found the effects of it; for as he was going one night to his convent, about six months after the accommodation, he was attacked by five ruffians armed with stilettos, who gave him no less than fifteen stabs, three of which wounded him in such a manner that he was left for dead. The murderers fled for refuge to the nuncio, and were afterwards received into the pope's dominions; but were pursued by divine justice, and all, except one man who died in prison, perished by violent deaths.

This, and other attempts upon his life, obliged him to confine himself to his convent, where he engaged in writing the History of the Council of Trent; a work unequalled for the judicious disposition of the matter, and artful texture of the narration; commended by Dr Burnet as the completest model of historical writing; and celebrated by Mr Wotton as equivalent to any production of antiquity; in which the reader finds "liberty without licentiousness, piety without hypocrisy, freedom of speech without neglect of decency, severity without rigour, and extensive learning without ostentation."

In this, and other works of less consequence, he spent the remaining part of his life to the beginning of the year 1622, when he was seized with a cold and fever, which he neglected till it became incurable. He languished more than twelve months, which he spent almost wholly in a preparation for his passage into eternity; and among his prayers and aspirations was often heard to repeat, "Lord! now let thy servant depart in peace." On Sunday the eighth of January of the next year, he rose, weak as he was, to mass, and went to take his repast with the rest; but on Monday was seized with a weakness that threatened immediate death; and on Thursday prepared for his change, by receiving the viaticum, with such marks of devotion as equally melted and edified the beholders. Through the whole course of his illness to the last hour of his life he was consulted by the senate in public affairs, and returned answers in his greatest weakness with such presence of mind as could only arise from the consciousness of innocence.

On Saturday, the day of his death, he had the passion of our blessed Saviour read to him out of St John's gospel, as on every other day of that week, and spoke of the mercy of his Redeemer, and his confidence in his merits. As his end evidently approached, the brethren of the convent came to pronounce the last prayers, with which he could only join in his thoughts,

being able to pronounce no more than these words, *Ego perpetua*, "Mayest thou last for ever;" which was understood to be a prayer for the prosperity of his country. Thus died F. Paul, in the 71st year of his age; hated by the Romans as their most formidable enemy, and honoured by all the learned for his abilities, and by the good for his integrity. His detestation of the corruption of the Roman church appears in all his writings, but particularly in this memorable passage of one of his letters: "There is nothing more essential than to ruin the reputation of the Jesuits. By the ruin of the Jesuits, Rome will be ruined; and if Rome is ruined, religion will reform of itself." He appears, by many passages of his life, to have had a high esteem of the church of England; and his friend F. Fulgentio, who had adopted all his notions, made no scruple of administering to Dr Duncombe, an English gentleman that fell sick at Venice, the communion in both kinds, according to the Common Prayer which he had with him in Italian. He was buried with great pomp at the public charge, and a magnificent monument was erected to his memorial.

PAUL, in sea language, is a short bar of wood or iron, fixed close to the capstern or windlass of a ship, to prevent those engines from rolling back or giving way when they are employed to heave in the cable, or otherwise charged with any great effort.

PAULIANISTS, PAULIANISTÆ, a sect of heretics, so called from their founder Paulus Samosatenus, a native of Samosata, elected bishop of Antioch in 262. His doctrine seems to have amounted to this: that the Son and the Holy Ghost exist in God in the same manner as the faculties of reason and activity do in man; that Christ was born a mere man; but that the reason or wisdom of the Father descended into him, and by him wrought miracles upon earth, and instructed the nations; and, finally, that, on account of this union of the Divine Word with the man Jesus, Christ might, though improperly, be called God. It is also said, that he did not baptize in the name of the Father and the Son, &c.; for which reason the council of Nice ordered those baptized by him to be re-baptized.

Being condemned by Dionysius Alexandrinus in a council, he abjured his errors, to avoid deposition; but soon after he resumed them, and was actually deposed by another council in 269.—He may be considered as the father of the modern Socinians; and his errors are severely condemned by the council of Nice, whose creed differs a little from that now used, under the same name, in the church of England. The creed agreed upon by the Nicene fathers, with a view to the errors of Paulus Samosatenus, concludes thus: *τους δε λεγοντας ην ποτε ουκην, και πριν γεννηθηναι, ουκ ην, &c. τουτους αναθεματιζει η καθολικη και αποστολικη εκκλησια.*—"But those who say he was when he was not, and was not before he was born, the catholic and apostolic church anathematizes." To those who have any veneration for the council of Nice this must appear a very severe, and perhaps not unjust, censure of the modern Hutchinsonians as well as of the Socinians.

PAULICIANS, a branch of the ancient Manichees, so called from their founder, one Paulus, an Armenian, in the seventh century; who, with his brother John, both of Samosata, formed this sect: though others

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Paulicians.

Paulicians. are of opinion, that they were thus called from another Paul, an Armenian by birth, who lived under the reign of Justinian II. In the seventh century a zealot called Constantine revived this drooping sect, which had suffered much from the violence of its adversaries, and was ready to expire under the severity of the imperial edicts, and the zeal with which they were carried into execution. The Paulicians, however, by their number, and the countenance of the emperor Nicephorus, became formidable to all the East.

But the cruel rage of persecution, which had for some years been suspended, broke forth with redoubled violence under the reigns of Michael Curopalates and Leo the Armenian, who inflicted capital punishment on such of the Paulicians as refused to return into the bosom of the church. The empress Theodora, tutors of the emperor Michael, in 845, would oblige them either to be converted or to quit the empire: upon which several of them were put to death, and more retired among the Saracens; but they were neither all exterminated nor banished.

Upon this they entered into a league with the Saracens; and choosing for their chief an officer of the greatest resolution and valour, whose name was Carbeas, they declared against the Greeks a war which was carried on for fifty years with the greatest vehemence and fury. During these commotions, some Paulicians, towards the conclusion of this century, spread abroad their doctrines among the Bulgarians; many of them, either from a principle of zeal for the propagation of their opinions, or from a natural desire of flying from the persecution which they suffered under the Grecian yoke, retired, about the close of the eleventh century, from Bulgaria and Thrace, and formed settlements in other countries. Their first migration was into Italy; whence, in process of time, they sent colonies into almost all the other provinces of Europe, and formed gradually a considerable number of religious assemblies, who adhered to their doctrine, and who were afterwards persecuted with the utmost vehemence by the Roman pontiffs. In Italy they were called *Patarini*, from a certain place called Pataria, being a part of the city of Milan, where they held their assemblies; and *Cathari* or *Gazari*, from Gazaria, or the Lesser Tartary. In France they were called *Albigenses*, though their faith differed widely from that of the Albigenses whom Protestant writers generally vindicate. (See *ALBIGENSES*). The first religious assembly the Paulicians had formed in Europe is said to have been discovered at Orleans in 1017, under the reign of Robert, when many of them were condemned to be burnt alive. The ancient Paulicians, according to Photius, expressed the utmost abhorrence of Manes and his doctrine. The Greek writers comprise their errors under the six following particulars: 1. They denied that this inferior and visible world is the production of the supreme Being; and they distinguish the Creator of the world and of human bodies from the most high God who dwells in the heavens; and hence some have been led to conceive that they were a branch of the Gnostics rather than of the Manichæans. 2. They treated contemptuously the Virgin Mary; or, according to the usual manner of speaking among the Greeks, they refused to adore and worship her. 3. They refused to celebrate the institution of the Lord's supper. 4. They

loaded the cross of Christ with contempt and reproach; by which we are only to understand, that they refused to follow the absurd and superstitious practice of the Greeks, who paid to the pretended wood of the cross a certain sort of religious homage. 5. They rejected, after the example of the greatest part of the Gnostics, the books of the Old Testament; and looked upon the writers of that sacred history as inspired by the Creator of this world, and not by the supreme God. 6. They excluded presbyters and elders from all part in the administration of the church.

PAULINA, a Roman lady, wife of Saturninus governor of Syria, in the reign of the emperor Tiberius. Her conjugal peace was disturbed, and violence was offered to her virtue, by a young man named Mundus, who fell in love with her, and had caused her to come to the temple of Isis by means of the priests of that goddess, who declared that Anubis wished to communicate to her something of moment. Saturninus complained to the emperor of the violence which had been offered to his wife; and the temple of Isis was overturned, and Mundus banished, &c.— There was besides a *Paulina*, wife of the philosopher Seneca. She attempted to kill herself when Nero had ordered her husband to die. The emperor, however, prevented her; and she lived some few years after in the greatest melancholy.

PAULINIA, in botany: A genus of the trigynia order, belonging to the octandria class of plants; and in the natural method ranking under the 23d order, *Tribilata*. Its characters are these: the flower has a permanent empalement, composed of four small oval leaves; it has four oblong oval petals, twice the size of the empalement; and eight short stamina with a turbinate germen, having three short slender styles, crowned by spreading stigmas; the germen turns to a large three-cornered capsule with three cells, each containing one almost oval seed. Linnæus reckons seven, and Miller nine, species, natives of the West Indies.

PAULINUS, a bishop who flourished in the early part of the 7th century. He was the apostle of Yorkshire, having been the first archbishop of York. This dignity seems to have been conferred on him about the year 626. He built a church at Almonbury, and dedicated it to St Alban, where he preached to and converted the Brigantes. Camden mentions a cross at Dewsborough, which had been erected to him with this inscription, *Paulinus hic predicavit et celebravit*. York was so small about this time, that there was not so much as a small church in it in which King Edwin could be baptized. Constantius is said to have made it a bishopric. Pope Honorius made it a metropolitan see. We are told that Paulinus baptized in the river Swale, in one day, 10,000 men, besides women and children, on the first conversion of the Saxons to Christianity, besides many at Halystone. At Walsstone, in Northumberland, he baptized Sebert king of the East Saxons. Bede says, "Paulinus coming with the king and queen to the royal manor called *Ad-Gebrin* (now Yeverin), staid there 36 days with them, employed in the duties of catechizing and baptizing. In all this time he did nothing from morning to night but instruct the people, who flocked to him from all the villages and places, in the doctrine of Christ and salvation; and, after they were instructed, baptizing them

Paulina
||
Paulinus.

Paulo. them in the neighbouring river Glen." According to the same Bede, "he preached the word in the province of Lindisfi; and first converted the governor of the city of Lindocollina, whose name was Blecca, with all his family. In this city he built a stone church of exquisite workmanship, whose roof being ruined by long neglect or the violence of the enemy, only the walls are now standing." He is also said to have founded a collegiate church of prebends near Southwell, in Nottinghamshire, dedicated to the Virgin Mary. This church he is said to have built when he baptized the Coritani in the Trent.

PAULO (Marco), a celebrated traveller, was son to Nicholas Paulo, a Venetian, who went with his brother Matthew, about the year 1255, to Constantinople, in the reign of Baudoin II. Nicholas, at his departure, left his wife big with child; and she brought to the world the famous Marco Paulo, the subject of this memoir. The two Venetians, having taken leave of the emperor, crossed the Black Sea, and travelled into Armenia; whence they passed over land to the court of Barka, one of the greatest lords of Tartary, who loaded them with honours. This prince having been defeated by one of his neighbours, Nicholas and Matthew made the best of their way through the deserts, and arrived at the city where Kublai, grand khan of the Tartars, resided. Kublai was entertained with the account which they gave him of the European manners and customs; and appointed them ambassadors to the pope, in order to demand of his holiness a hundred missionaries. They came accordingly to Italy, obtained from the Roman pontiff two Dominicans, the one an Italian the other an Asiatic, and carried along with them young Marco, for whom Kublai expressed a singular affection. This young man, having learned the different dialects of Tartary, was employed in embassies which gave him the opportunity of traversing Tartary, China, and other eastern countries. At length, after a residence of seventeen years at the court of the grand khan, the three Venetians returned to their own country, in the year 1295, with immense fortunes. A short time after his return, Marco serving his country at sea against the Genoese, his galley, in a great naval engagement, was sunk, and himself taken prisoner, and carried to Genoa. He remained there many years in confinement; and, as well to amuse his melancholy as to gratify those who desired it from him, he sent for his notes from Venice, and composed the history of his own and his father's voyages in Italian, under this title, *Delle maraviglie del mondo da lui vidute*, &c.; the first edition of which appeared at Venice, in 8vo, 1496. His work was translated into different languages, and inserted in various collections. The editions most esteemed are the Latin one published by Andrew Muller at Cologne, in 4to, 1671; and that in French, to be found in the collection of voyages published by Bergeron, at the Hague, 1735, in 2 vols 4to. In the writings of Marco Paulo, there are some things true and others highly incredible. It is indeed difficult to believe, that as soon as the grand khan was informed of the arrival of two Venetian merchants, who were come to sell theriaca (or treacle) at his court, he sent before them an escort of 40,000 men, and afterwards dispatched these Venetian ambassadors to the Pope, to beseech his holiness to send

him a hundred missionaries. It is equally difficult to believe that the pope, who doubtless had an ardent zeal for the propagation of the faith, instead of a hundred, should have sent him only two missionaries. There are therefore some errors and exaggerations in Marco Paulo's narrative; but many other things which were afterwards verified, and which have been of service to succeeding travellers, prove that in several respects his relation is valuable. He not only gave better accounts of China than had been before received; but likewise furnished a description of Japan, of many of the islands of the East Indies, of Madagascar, and the coasts of Africa; so that from his work it might be easily collected, that a direct passage by sea to the Indies was not only possible, but practicable. It may be worth while to add, that, in the opinion of the authors of the Universal History, what he wrote from his own knowledge is both curious and true, so that where he has erred his father and uncle must have deceived him.

PAULUS ÆMILIUS. See ÆMILIUS Paulus.

PAVO, the PEACOCK, in ornithology; a genus belonging to the order of gallinæ. The head is covered with feathers which bend backwards; the feathers of the tail are very long, and beautifully variegated with eyes of different colours. Latham enumerates eight species:

1. The cristatus, or common peacock of English authors, has a compressed crest and solitary spurs.—*Latham's Synopsis of Birds.* It is about the size of a common turkey; the length from the tip of the bill to the end of the tail being three feet eight inches. The bill is nearly two inches long, and is of a brown colour. The irides are yellow. On the crown there is a sort of crest, composed of 24 feathers, which are not webbed except at the ends, which are gilded green. The shafts are of a whitish colour; and the head, neck, and breast, are of a green gold colour. Over the eye there is a streak of white, and beneath there is the same. The back and rump are of a green gold colour, glossed over with copper: the feathers are distinct, and lie over each other like shells. "Above the tail springs an inimitable set of long beautiful feathers, adorned with a variegated eye at the end of each; these reach considerably beyond the tail; and the longest of them in many birds are four feet and a half in length. This beautiful train, or tail as it is falsely called, may be expanded quite to a perpendicular upwards at the will of the bird. The true tail is hid beneath this group of feathers, and consists of 18 grey brown feathers, one foot and a half long, marked on the sides with rufous grey: the scapulars and lesser wing coverts are reddish cream-colour, variegated with black: the middle coverts deep blue, glossed with green gold: the greatest and bastard wing rufous: the quills are also rufous; some of them variegated with rufous, blackish, and green: the belly and vent are greenish black: the thighs yellowish: the legs stout; those of the male furnished with a strong spur three quarters of an inch in length; the colour of them grey brown."

The female is rather less than the male. The train is very short, being much shorter than the tail, and scarcely longer than its coverts; neither are the feathers furnished with eyes. The crest on the head is similar to that on the head of the male: the sides of the head have a greater portion of white: the throat and neck

Paulus,
Pavo.

Pavo.

are green : the rest of the body and wings are cinereous brown : the breast is fringed with white : the bill is the same : the irides are lead-colour : the legs are as in the male ; but the spur is generally wanting, though in some birds a rudiment of one is seen. In some male birds, all the wing coverts and scapulars are of a fine deep blue green, very glossy ; but the outer edge of the wing and quills are of the common colour.

This bird, now so common in Europe, is of eastern origin, being a native of India. They are found wild in the islands of Ceylon and Java in the East Indies, and at St Helena, at Barbuda, and other West India islands. They are not natural to China ; but they are found in many places of Asia and Africa. They are, however, nowhere so large or so fine as in India, in the neighbourhood of the Ganges, from whence, by degrees, they have spread into all parts, increasing in a wild state in the warmer climes ; but wanting some care in the colder regions. In ours, this bird does not come to its full plumage till the third year. The female lays five or six greyish white eggs ; in hot climates 20, the size of those of a turkey. These, if let alone, she lays in some secret place, at a distance from the usual resort, to prevent their being broken by the male, which he is apt to do if he find them. The time of sitting is from 27 to 30 days. The young may be fed with curd, chopped leeks, barley-meal, &c. moistened ; and are fond of grasshoppers, and some other insects. In five or six months they will feed as the old ones, on wheat and barley, with what else they can pick up in the circuit of their confinement. They seem to prefer the most elevated places to roost on during night ; such as high trees, tops of houses, and the like. Their cry is loud and inharmonious ; a perfect contrast to their external beauty. They are caught in India, by carrying lights to the trees where they roost, and having painted representations of the bird presented to them at the same time ; when they put out the neck to look at the figure, the sportsman slips a noose over the head, and secures his game (A). In most ages they have been esteemed as a salutary food. Hortensius gave the example at Rome, where it was carried to the highest luxury, and sold dear (B) : and a young pea-fowl is thought a dainty even in the present times.

The life of this bird is reckoned by some at about 25 years ; by others 100.

2. The variegated peacock, is nothing else but a mixed breed between the common and white peacock ; and of course varies very considerably in colour.

3. The white peacock is, as its name imports, entirely white, not excepting even the eyes of the train, which it is nevertheless easy to trace out. This variety is in Latham's opinion more common in England than elsewhere. We are informed by the same author, that two instances have occurred to him of the

females of this species having the external marks of the plumage of the male.

4. The pavo muticus is about the size of the crested peacock ; but the bill is larger and ash-coloured : the irides are yellow, and round the eyes is red ; on the top of the head is an upright crest four inches long, and shaped somewhat like an ear of corn. The colour is green mixed with blue. The top of the neck and head are greenish, marked with spots of blue, which have a streak of white down the middle of each : the back is greenish blue : the breast is blue and green gold mixed : the belly, sides, and thighs are ash-colour, marked with black spots, streaked with white on the belly : the wing coverts and secondaries are not unlike the back : the greater quills are green, transversely barred with black lines, but growing yellowish towards the ends, where they are black : the upper tail coverts are fewer than those of the common peacock, but much longer than the tail ; they are of a chestnut brown, with white shafts, and have at the end of each a large spot gilded in the middle, then blue, and surrounded with green : the legs are ash-coloured, and not furnished with spurs, or they have been overlooked by those who have seen them.

The female is smaller than the male ; and differs in having the belly quite black, and the upper tail coverts much shorter : the tail is green, edged with blue, and white shafts. It inhabits Japan, and is only known to Europe by means of a painting, sent by the emperor of Japan to the pope.

So beautiful a species of birds as the peacock could not long remain a stranger in the more distant parts in which they were produced ; for so early as the days of Solomon, we find, among the articles imported in his Tarshish navies, apes and peacocks. A monarch so conversant in all branches of natural history, "who spoke of trees, from the cedar of Lebanon, even unto the hyssop that springeth out of the wall ; who spoke also of beasts and of fowl," would certainly not neglect furnishing his officers with instructions for collecting every curiosity in the countries they voyaged to, which gave him a knowledge that distinguished him from all the princes of his time. Ælian relates, that they were brought into Greece from some barbarous country ; and that they were held in such high esteem, that a male and female were valued at Athens at 1000 drachmæ, or 32 l. 5 s. 10 d. Their next step might be to Samos ; where they were preserved about the temple of Juno, being the birds sacred to that goddess ; and Gellius, in his *Noces Atticæ*, c. 16. commends the excellency of the Samian peacocks. It is therefore probable, that they were brought there originally for the purposes of superstition, and afterwards cultivated for the uses of luxury. We are also told, when Alexander was in India, he found

Pavo.

(A) Tavernier's Travels, vol. iii. p. 57. The inhabitants of the mountains on both sides of the Ganges catch them with a birdlime, prepared from the milky juice of two sorts of trees (*ficus religiosa* & *Indica*.—Lin.), boiled with oils into a consistence ; which proves sufficiently tenacious to entangle them, or the largest birds.—*Phil. Transf.* vol. lxxi. p. 376.

(B) They must have been in plenty notwithstanding, or the Emperor Vitellius could not have got sufficient for his large dish, called the *Buckler of Minerva*, which, history says, was filled with the livers of scari, tongues of flamingoes, and brains of pheasants and peacocks.

Pavo. found vast numbers of wild ones on the banks of the Hyarotis; and was so struck with their beauty, as to appoint a severe punishment on any person that killed them.

Peacocks crests, in ancient times, were among the ornaments of the kings of England. Ernald de Ac-
lent was fined to king John in 140 palfries, with sack-
buts, lorains, gilt spurs, and peacocks crests, such as
would be for his credit. See Plate CCCLXXXI.

5. The *pavo bicalcaratus*, is larger than the common pheasant. The bill is black, but from the nostrils to the tip of the upper mandible red. The irides are yellow. The feathers on the crown of the head are sufficiently long to form a crest, of a dull brown colour. The space between the bill and eyes is naked, with a few scattered hairs: the sides of the head are white: the neck is bright brown, striated across with dusky brown: the upper parts of the back, scapulars, and wing coverts, are dull brown, dotted with paler brown and yellowish; besides which, each feather is marked near the end with a roundish large spot of a gilded purple colour, changing into blue and green in different lights: the lower part of the back and rump are dotted with white: all the under parts are brown, striated transversely with black: the quills are dusky; the secondaries are marked with the same spot as the rest of the wing: the upper tail coverts are longer than the tail, and each marked at the end with a spot like the wing feathers, each of which is surrounded first with a circle of black, and ultimately with an orange one: the legs and claws are brown, and on the back part of each leg are two spurs, one above the other.

The female is a third smaller than the male. The head, neck, and under parts are brown; the head smooth: the upper parts are also brown, and the feathers marked with a dull blue spot, surrounded with dirty orange: the feathers which cover the tail are similar; but marked at the end with an obscure dull oval spot of blue: the legs have no spurs.

This species is of Chinese origin, and some of them have been brought from China to England alive, and have been for some time in the possession of Dr James Monro. The male is now in the Leverian Museum, in the finest preservation.

Sonnerat observes, that the bird from whence his description was taken had two spurs on one leg, and three on the other. This must surely be a *lusus nature*; especially as he says, it is the same as that in *Edw. pl. 67*.

6. The *pavo tibetanus*, is about the size of a pinto-do, being about two feet and nearly two inches long. The bill is above an inch and a half long, and cinereous: the irides are yellow: the head, neck and under parts are ash-coloured, marked with blackish lines: the wing coverts, back and rump, are grey, with small white dots; besides which, on the wing coverts and back are large round spots of a fine blue, changing in different lights to violet and green gold: the quills and upper tail coverts are also grey, marked with blackish lines; the quills have two round blue spots on each, like those of the coverts; on the outer webs, and on each tail feather, there are four of the same, two on each side the web; the middle coverts are the longest, the others shorten by degrees: the legs are grey, fur-

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nished with two spurs behind, like the last species: the claws are blackish. This species inhabits the kingdom of Thibet. The Chinese give it the name of *Chin-ichien-Khi*.

PAVO, in ichthyology. See *PEACOCK-fish*.

PAVO, in astronomy, a constellation in the southern hemisphere, unknown to the ancients, and not visible in our latitude. It consists of 14 stars, of which the names and situations are as follow:

	Stars.	Longitud.	Latitude South.	Magnitude.
The eye of the peacock	19	0 0 336	11 18	2
In the breast		24 41 51	46 56 21	3
In the right wing		18 41 38	45 52 34	3
In the middle		3 42 28	44 29 8	3
In the root of the tail, first		3 53 24	44 6 13	5
5.				
second		2 42 11	41 37 9	5
third		3 55 22	39 3 23	4
fourth		5 11 33	37 10 46	6
fifth		0 49 34	38 54 14	5
sixth	1	29 39 17	38 3 36	4
10.				
seventh		27 22 54	40 9 28	5
last		24 7 44	41 28 2	4
In the right foot	19	1 22 11	48 6 3	4
In the left foot		9 43 75	49 7 4	

See ASTRONOMY, n° 406.

PAVOR, a Roman deity, whose worship was introduced by Tullus Hostilius, who, in a panic, vowed a shrine to him, and one to Pallor, *Paleness*; and therefore they are found on the coins of that family.

PAURÆDASTYLÆ, in natural history, the name of a genus of perfect crystals with double pyramids, and no intermediate column, composed of 12 planes, or two hexangular pyramids joined base to base.

PAUSANIA, in Grecian antiquity, a festival in which were solemn games, wherein nobody contended but free-born Spartans; in honour of Pausanias the Spartan general, under whom the Greeks overcame the Persians in the famous battle of Platæa.

PAUSANIAS, a Spartan king and general, who signalized himself at the battle of Platæa against the Persians. The Greeks, very sensible of his services, rewarded his merit with a tenth of the spoils taken from the Persians. He was afterwards appointed to command the Spartan armies, and he extended his conquests in Asia; but the haughtiness of his behaviour created him many enemies; and the Athenians soon obtained a superiority in the affairs of Greece.—Pausanias, dissatisfied with his countrymen, offered to betray Greece to the Persians, if he received in marriage as the reward of his perfidy the daughter of their king. His intrigues were discovered by means of a young man who was intrusted with his letters to Persia, and who refused to go, on recollecting that such as had been employed in that office before had never returned. The letters were given to the Ephori of Sparta, and the perfidy of Pausanias was thus discovered. He fled for safety to a temple of Minerva; and as the sanctity of the place screened him from the violence

Pausanias
||
Peace.

of his pursuers, the sacred building was surrounded with heaps of stones, the first of which was carried there by the indignant mother of the unhappy man. He was starved to death in the temple, and died about 474 years before the Christian era. There was a festival and solemn games instituted to his honour, in which only free-born Spartans contended. There was also an oration spoken in his praise, in which his actions were celebrated, particularly the battle of Plataea, and the defeat of Mardonius. See PAUSANIA.

PAUSANIAS, a learned Greek historian and orator, in the second century, under the reign of Antoninus the philosopher, was the disciple of Herodas Atticus. He lived for a long time in Greece; and afterwards went to Rome, where he died at a great age. He wrote an excellent description of Greece, in ten books; in which we find not only the situation of places, but the antiquities of Greece, and every thing most curious and worthy of knowledge. Abbe Gedoin has given a French translation of it, in 2 vols 4to.

PAUSE, a stop or cessation in speaking, singing, playing, or the like. One use of pointing in grammar is to make proper pauses, in certain places.—There is a pause in the middle of each verse; in an hemistich, it is called a *rest* or *repose*. See POETRY, and READING.

PAW, in the manege. A horse is said to paw the ground, when, his leg being either tired or painful, he does not rest it upon the ground, and fears to hurt himself as he walks.

PAWN, a pledge or gage for surety of payment of money lent. It is said to be derived *a pugno, quia res quae pignori dantur, pugno vel manu traduntur*. The party that pawns goods hath a general property in them; they cannot be forfeited by the party that hath them in pawn for any offence of his, nor be taken in execution for his debt; neither may they otherwise be put in execution till the debt for which they are pawned is satisfied.

If the pawn is laid up, and the pawnee robbed, he is not answerable; though if the pawnee use the thing, as a jewel, watch, &c. that will not be the worse for wearing, which he may do, it is at his peril; and if he is robbed, he is answerable to the owner, as the using occasioned the loss, &c.

If the pawn is of such a nature that the keeping is a charge to the pawnee, as a cow or a horse, &c. he may milk the one and ride the other, and this shall go in recompence for his keeping.

Things which will grow the worse by using, as apparel, &c. he may not use.

PEA, in botany. See PISUM.

PEACE (*Temple of*), a celebrated temple at Rome, which was consumed by fire A. D. 191; produced, as some writers suppose, by a slight earthquake, for no thunder was heard at the time. Dio Cassius, however, supposes that it began in the adjoining houses. Be that as it will, the temple, with all the surrounding buildings, were reduced to ashes. That magnificent structure had been raised by Vespasian after the destruction of Jerusalem, and enriched with the spoils and ornaments of the temple of the Jews. The ancients speak of it as one of the most stately buildings in Rome. There men of learning used to hold their assemblies,

and lodge their writings, as many others deposited their jewels, and whatever else they esteemed of great value. It was likewise made use of as a kind of magazine for the spices that were brought by the Roman merchants out of Egypt and Arabia; so that many rich persons were reduced to beggary, all their valuable effects and treasures being consumed in one night, with the temple.

PEACH, in botany. See AMYGDALUS.

PEACOCK, in ornithology. See PAVO.

PEACOCK-Fish. *Pinna ani radiis 55, caudali falcata.*

The body of this fish is of various colours; the fin of the anus has 55 streaks, and its tail is in the form of a crescent. The head is without scales; it is brown upon the upper part, yellow above the eyes, and of a silver colour on the sides. The back is round, and adorned with beautiful blue streaks in a serpentine form; and the belly bright as silver. The fins of the breast are round, and, like those of the belly, have a yellow ground with a grey border; that of the back is of a violet colour; that of the anus is straw coloured; and, lastly, that of the tail is yellow on the sides, red towards the middle, and bordered with a deep blue. We are as yet ignorant of its length.

There is a variety of this fish found only in the Indian seas, and therefore called the *Indian peacock fish*; which is thus described in the language of Linnæus: *Pavo pinna caudali forcipata: spinis dorsalibus 14: ocello caeruleo pone oculos*. It has the fin of its tail forked; 14 sharp points or prickles on the back, with a round blue streak behind the eyes.

The body of this fish is of an elliptical form; the head is covered with scales to the tip of the snout; the two jaws are armed with long and sharp teeth; the ball of the eye is black, and the iris of a white colour, with a mixture of green. At the insertion of the fins of the belly is found a bony substance. The head, back, and sides, are of a yellow colour, more or less deep, and covered with lines or streaks of sky-blue. These colours are so agreeably mixed, that they resemble the elegance of the peacock's tail.

PEAK OF DERBYSHIRE, a chain of very high mountains in the county of Derby in England, famous for the mines they contain, and for their remarkable caverns. The most remarkable of these are Pool's-hole and Elden-hole. The former is a cave at the foot of a high hill called *Coitmoſs*, so narrow at the entrance that passengers are obliged to creep on all-fours; but it soon opens to a considerable height, extending to above a quarter of a mile, with a roof somewhat resembling that of an ancient cathedral. By the petrifying water continually dropping in many parts of the cave are formed a variety of curious figures and representations of the works both of nature and art. There is a column here as clear as alabaster, which is called *The Queen of Scots Pillar*, because Queen Mary is said to have proceeded thus far when she visited the cavern. It seems the curiosity of that princess had led her thus far into this dark abode; and indeed there are few travellers who care to venture farther; but others, determined to see the end of all, have gone beyond it. After sliding down the rock a little way, is found the dreary cavity turned upwards: following its course, and climbing from crag to crag, the traveller arrives at a great height, till the rock, closing over his head

Peach
||
Peak.

Peak. on all sides, puts an end to any further subterraneous journey. Just at turning to descend, the attention is caught by a chasm, in which is seen a candle glimmering at a vast depth underneath. The guides say, that the light is at a place near Mary Queen of Scots pillar, and no less than 80 yards below. It appears frightfully deep indeed to look down; but perhaps does not measure any thing like what it is said to do. If a pistol is fired by the Queen of Scots pillar, it will make a report as loud as a cannon. Near the extremity there is a hollow in the roof, called the *Needle's Eye*; in which if a candle is placed, it will represent a star in the firmament to those who are below. At a little distance from this cave is a small clear stream consisting of hot and cold water, so near each other, that the finger and thumb of the same hand may be put, the one into the hot water and the other into the cold.

Elden-hole is a dreadful chasm in the side of a mountain; which, before the latter part of the last century, was thought to be altogether unfathomable. In the time of Queen Elizabeth, a poor man was let down into it for 200 yards; but he was drawn up in a frenzy, and soon after died. In 1682, it was examined by Captain Collins, and in 1699 by Captain Sturmy, who published their accounts in the Philosophical Transactions. The latter descended by ropes fixed at the top of an old lead-ore pit, four fathoms almost perpendicular, and from thence three fathoms more obliquely, between two great rocks. At the bottom of this he found an entrance into a very spacious cavern, from whence he descended along with a miner for 25 fathoms perpendicular. At last they came to a great river or water, which he found to be 20 fathoms broad and eight fathoms deep. The miner who accompanied him, insisted that this water ebbed and flowed with the sea; but the Captain disproved this assertion, by remaining in the place from three hours flood to two hours ebb, during which time there was no alteration in the height of the water. As they walked by the side of this water, they observed a hollow in the rock some feet above them. The miner went into this place, which was the mouth of another cavern; and walked for about 70 paces in it, till he just lost sight of the Captain. He then called to him, that he had found a rich mine; but immediately after came running out and crying, that he had seen an evil spirit; neither could any persuasions induce him to return. The floor of these caverns is a kind of white stone enamelled with lead ore, and the roofs are encrusted with shining spar. On his return from this subterraneous journey, Captain Sturmy was seized with a violent headach, which, after continuing four days, terminated in a fever, of which he died in a short time.

Several years ago this cavern was visited by the late Mr James Ferguson: who tells us, that it consists of two hollows one over another; but that the mouth of the lowermost is now stopped up by planks of timber laid across it, on which is a heap of stones thrown in at the upper mouth with a design to fill up the cavern entirely; which, however, will probably be never accomplished on account of its vast size.

Peak of Teneriffe. See TENERIFFE.

PEAN, in heraldry, is when the field of a coat of arms is sable, and the powderings or.

PEAR, in botany. See PYRUS.

PEAR-Glass. See *VITREA Lacryma*.

PEARCE (Dr), lord bishop of Rochester, was the son of a distiller in High Holborn. He married Miss Adams, the daughter of a distiller in the same neighbourhood, with a considerable fortune, who lived with him 52 years in the highest degree of connubial happiness. He had his education in Westminster school, where he was distinguished by his merit, and elected one of the king's scholars. In 1710, when he was 20 years old, he was elected to Trinity College, Cambridge. During the first years of his residence at the university, he sometimes amused himself with lighter compositions, some of which are inserted in the *Guardian* and *Spectator*. In 1716, he published his edition of *Cicero de Oratore*, and, at the desire of a friend, luckily dedicated it to Lord Chief Justice Parker (afterwards Earl of Macclesfield), to whom he was a stranger. This incident laid the foundation of his future fortune; for Lord Parker soon recommended him to Dr Bentley, master of Trinity, to be made one of the fellows; and the doctor consented to it on this condition, that his lordship would promise to *unmake* him again as soon as it lay in his power to give him a living. In 1717, Mr Pearce was ordained at the age of 27; having taken time enough, as he thought, to attain a sufficient knowledge of the sacred office. In 1718, Lord Parker was appointed chancellor, and invited Mr Pearce to live with him in his house as chaplain. In 1719, he was instituted into the rectory of Stapleford Abbots, in Essex; and in 1720, into that of St Bartholomew, behind the Royal Exchange, worth 400 l. *per annum*. In 1723, the lord chancellor presented him to St Martin's in the Fields. His Majesty, who was then at Hanover, was applied to in favour of St Claget, who was then along with him; and the doctor actually kissed hands upon the occasion: but the chancellor, upon the king's return, disputed the point, and was permitted to present Mr Pearce.—Mr Pearce soon attracted the notice and esteem of persons in the highest stations and of the greatest abilities. Beside Lord Parker, he could reckon amongst his patrons or friends, Lord Macclesfield, Mr Pulteney (afterwards Earl of Bath), archbishop Potter, Lord Hardwicke, Sir Isaac Newton, and other illustrious personages.—In 1724, the degree of doctor of divinity was conferred on him by archbishop Wake. The same year he dedicated to his patron, the earl of Macclesfield, his edition of *Longinus on the Sublime*, with a new Latin version and notes.

When the church of St Martin's was rebuilt, Dr Pearce preached a sermon at the consecration, which he afterwards printed, and accompanied with an essay on the origin and progress of temples, traced from the rude stones which were first used for altars to the noble structure of Solomon, which he considers as the first temple completely covered. His observations on that building which is called the *Temple of Dagon* removes part of the difficulty which presents itself in the narration of the manner in which Samson destroyed it.

The deanery of Winchester becoming vacant, Dr

Pearce.

Pearce was appointed dean in 1739; and in the year 1744 he was elected prolocutor of the lower house of convocation for the province of Canterbury. His friends now began to think of him for the episcopal dignity; but Mr Dean's language rather declined it. However, after several difficulties had been started and removed, he consented to accept the bishopric of Bangor, and promised Lord Hardwicke to do it with a good grace. He accordingly made proper acknowledgments of the royal goodness, and was consecrated Feb. 12. 1748. Upon the declining state of health of Dr Wilcocks, bishop of Rochester, the bishop of Bangor was several times applied to by archbishop Herring to accept of Rochester, and the deanery of Westminster, in exchange for Bangor; but the bishop then first signified his desire to obtain leave to resign and retire to a private life. His lordship, however, upon being pressed, suffered himself to be prevailed upon. — "My Lord (said he to the Duke of Newcastle), your grace offers these dignities to me in so generous and friendly a manner, that I promise you to accept them." Upon the death of Bishop Wilcocks he was accordingly promoted to the see of Rochester and deanery of Westminster in 1756. Bishop Sherlock died in 1761, and Lord Bath offered his interest for getting the bishop of Rochester appointed to succeed him in the diocese of London; but the bishop told his lordship, that he had determined never to be bishop of London or archbishop of Canterbury.

In the year 1763, his lordship being 73 years old, and finding himself less fit for the business of his stations as bishop and dean, informed his friend Lord Bath of his intention to resign both, and live in a retired manner upon his private fortune. Lord Bath undertook to acquaint his majesty; who named a day and hour, when the bishop was admitted alone into the closet. He told the king, that he wished to have some interval between the fatigues of business and eternity; and desired his majesty to consult proper persons about the propriety and legality of his resignation. In about two months the king informed him, that Lord Mansfield saw no objection; and that Lord Northington, who had been doubtful, on farther consideration thought that the request might be complied with. Unfortunately for the bishop, Lord Bath applied for Bishop Newton to succeed. This alarmed the ministry, who thought that no dignities should be obtained but through their hands. They therefore opposed the resignation; and his majesty was informed that the bishops disliked the design. His majesty sent to him again; and at a third audience told him, that he must think no more of resigning. The bishop replied, "Sir, I am all duty and submission;" and then retired.

In 1768 he obtained leave to resign the deanery; in 1773, he lost his lady; and after some months of lingering decay, he died at Little Ealing, June 29. 1774.

This eminent prelate distinguished himself in every part of his life by the virtues proper to his station. His literary abilities, and application to sacred and philological learning, appear by his works; the principal of which are, A letter to the clergy of the church of England, on occasion of the bishop of Rochester's commitment to the Tower. 2d edit. 1722. Miracles of Jesus vindicated, 1727 and 1728. A review of the text of Milton, 1733. Two letters against Dr Middle-

ton, occasioned by the doctor's letter to Waterland, on the publication of his treatise, intitled, *Scripture Vindicated*, 3 edit. 1752. And since his death, a commentary with notes on the four Evangelists and the Acts of the Apostles, together with a new translation of St Paul's first Epistle to the Corinthians, with a paraphrase and notes, have been published, with his life prefixed, from original MSS. in 2 vols 4to.

The following character of this excellent bishop was published in the Gentleman's Magazine for 1775, and was written, as we are told, by a contemporary and friend. "The world has not lost for many years a more respectable member of society than the late Dr Pearce; nor the clergy a more pious and learned prelate. In his younger days, before he became a graduate, he published that excellent edition of Longinus, still admired and quoted by the best critics. What is said of Longinus himself by our excellent English poet, is as applicable to the editor: 'He is himself the great sublime he draws;' for very few of his order ever arrived to that perfection in eloquence, for which he was so justly celebrated. His diction was simple, nervous, and flowing; his sentiments were just and sublime; more sublime than the heathen critic, in proportion to the superior sublimity of the Christian revelation. Yet he was never puffed up with the general applauses of the world, but of an humble deportment, resembling the meek Jesus as far as the weakness of human nature can resemble a character without sin. His countenance was always placid, and displayed the benevolence of his heart, if his extensive charity had not proved it to a demonstration. His thirst of knowledge prompted him to a very studious life, and that rendered both his complexion and constitution delicate; yet it held out by the blessing of Providence beyond the 85th year of his age; which is the more extraordinary, considering the midnight lamp had cast a paleness over his complexion: yet with all his learning and knowledge, his humility and modesty restrained him from many publications, which the world may hope for from his executors; one particularly in divinity, which has been the object of his contemplation for many years past. With a view to complete that work, and to retire from the bustle of the world, he struggled so hard to resign his bishopric, &c. After possessing the esteem and veneration of all who knew him for a long series of years, either as rector of a very large parish, or as a dignitary of the church, he has left the world in tears; and gone to receive the infinite reward of his piety and virtue."

PEARCH, in ichthyology. See PERCA.

The perch affords good sport for the angler. The best time for their biting is when the spring is over, and before the heats of summer come on. At this time they are very greedy; and the angler, with good management, may take at one standing all that are in the hole, be they ever so many.

The proper baits are a minnow or young frog; but the worm called the *brandling*, well scoured, is also excellent at all times of the year. When the perch bites, he should always have a great deal of time allowed him to swallow the bait.

The perch will bite all day long, if the weather be cloudy; but the best time is from eight to ten in the morning, and from three till six in the afternoon.

The

Pearce,
Pearch.

Pearch,
Pearl.

Pearl.

The pearch is very abstemious in winter, and will seldom bite in this season of the year; if he does at all, it is in the middle of the day: at which time indeed all fish bite best at that season.

If the bait be a minow, which is the bait that affords most diversion to the angler, it must be fastened to the hook alive, by putting the hook through the upper lip or back-fin; it must be kept at about mid-water, and the float must be a quill and a cork, that the minow alone may not be able to sink it.

The line must be of silk, and strong; and the hook armed with a small and fine wire, that if a pike should take the bait, as is not unfrequently the case, he may be taken. The way to carry the minnows or small gudgeons alive for baits is this: A tin-pot is to be provided, with holes in the lid, and filled with water; and the fish being put in this, the water is to be changed once in a quarter of an hour by the holes, without taking off the lid at any time, except when the bait is to be taken out.

A small casting-net, made for these little fish, should be taken out with the pearch tackle; and one or two casts of this will take baits enough for the day, without any farther trouble. When the bait is a frog, the hook is to be fastened to the upper part of the leg. The best place for the fishing for pearch is in the turn of the water near some gravelly scour. A place of this kind being pitched upon, it should be baited over-night with lobworms chopped to pieces; and in the morning, on going to it, the depth is to be regularly plumbed, and then the hook is to be baited with the worm or other bait; and as it drags along, the pearch will soon seize upon it.

PEARCH-Glue, the name of a kind of glue, of remarkable strength and purity, made from the skins of pearches.

PEARL, in natural history, a hard, white, shining body, usually roundish, found in a testaceous fish resembling an oyster.

Pearls, though esteemed of the number of gems by our jewellers, and highly valued, not only at this time but in all ages, proceed only from a distemper in the creature that produces them, analogous to the bezoars and other stony concretions in several animals of other kinds.

The fish in which these are usually produced is the East Indian pearl-oyster, as it is commonly called. Besides this shell, there are many others that are found to produce pearls; as the common oyster, the muscle, and several others; the pearls of which are often very good; but those of the true Indian berberi, or pearl-oyster, are in general superior to all. The small or seed-pearls, also called *ounce pearls*, from their being sold by the ounce and not by tale, are vastly the most numerous and common: but, as in diamonds, among the multitudes of small ones, there are smaller numbers and larger found, so in pearls there are larger and larger kinds; but as they increase in size, they are proportionably less frequent; and this is one reason of their great price. We have Scotch pearls frequently as big as a little tare, some as big as a large pea, and some few of the size of a horse-bean; but these are usually of a bad shape, and of little value in proportion to their weight. Philip II. of Spain had a pearl perfect in its shape and colour, and of the size

of a pigeon's egg. The finest, and what is called the true shape of the pearl, is a perfect round; but if pearls of a considerable size are of the shape of a pear, as is not unfrequently the case, they are not less valued, as they serve for ear-rings and other ornaments. Their colour ought to be a pure white; and that not a dead and lifeless, but a clear and brilliant one: they must be perfectly free from any foulness, spot, or stain; and their surfaces must be naturally smooth and glossy; for they bring their natural polish with them, which art is not able to improve.

All pearls are formed of the matter of the shell, and consist of a number of coats spread with perfect regularity one over another, in the manner of the several coats of an onion, or like the several strata of the stones found in the bladders or stomachs of animals, only much thinner.

Manner of Fishing for PEARLS in the East Indies.—There are two seasons for pearl-fishing: the first is in March and April, and the last in August and September; and the more rain there falls in the year, the more plentiful are these fisheries. At the beginning of the season there are sometimes 250 barks on the banks; the larger barks have two divers, and the smaller one. As soon as the barks arrive at the place where the fish lie, and have cast anchor, each diver binds a stone, six inches thick and a foot long, under his body; which serves him as a ballast, prevents his being driven away by the motion of the water, and enables him to walk more steadily under the waves. They also tie another very heavy stone to one foot, by which they are very speedily sent to the bottom of the sea: and as the oysters are usually firmly fastened to the rocks, they arm their hands with leather mittens, to prevent their being wounded in pulling them violently off; but this task some perform with an iron rake. In the last place, each diver carries down with him a large net in the manner of a sack, tied to his neck by a long cord, the other end of which is fastened to the side of the bark. This net is to hold the oysters gathered from the rock, and the cord is to pull up the diver when his bag is full, or when he wants air.

In this equipage he sometimes precipitates himself sixty feet under water; and as he has no time to lose, he no sooner arrives at the bottom, than he begins to run from side to side, tearing up all the oysters he meets with, and cramming them into his budget.

At whatever depth the divers are, the light is so great, that they easily see whatever passes in the sea; and, to their great consternation, sometimes perceive monstrous fishes, from which all their address in muddying the water, &c. will not always save them, but they unhappily become their prey: and of all the dangers of the fishery, this is one of the greatest and most usual. The best divers will keep under water near half an hour, and the rest do not stay less than a quarter. During this time they hold their breath without the use of oils or any other liquors; only acquiring the habit by long practice. When they find themselves straitened, they pull the rope to which the bag is fastened, and hold fast by it with both hands: when those in the bark, taking the signal, heave them up into the air, and unload them of their

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their fish; which is sometimes 500 oysters, and sometimes not above 50. Some of the divers need a moment's respite to recover breath; others jump in again instantly, continuing this violent exercise without intermission for several hours.

On the shore they unload their barks, and lay their oysters in an infinite number of little pits dug in the sand four or five feet square, raising heaps of sand over them to the height of a man; and in this condition they are left till the rain, wind, and sun, have obliged them to open, which soon kills them: upon this the flesh rots and dries, and the pearls, thus disengaged, fall into the pit on their taking out the shells. After clearing the pits of the grosser filth, they sift the sand several times in order to find the pearl; but, whatever care they take, they always lose a great many. After cleaning and drying the pearls, they are passed through a kind of sieve, according to their sizes; the smallest are then sold as seed-pearls, and the rest put up to auction, and sold to the highest bidder.

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Though those ornaments are met with in all quarters of the globe, the most esteemed have always been those of Asia and the east coast of Africa. In the kingdom of Madura, which lies on the east of Malabar, there are many pearl fisheries. Tutukurin or Tutucorin is the principal, if not the only, city on the fishery coast. At the time the Portuguese were masters in these parts, the taking of oysters in the straits betwixt the island of Ceylon and the continent, was styled, by way of excellence, the *fishery*, and very deservedly; for though some prefer the pearls taken near the island of Baharen in the Persian gulf, and those likewise found on the coast of China at Hainan, yet it might be very easily proved, from the comparison of the annual amount of those fisheries within this period, that they were very seldom superior to this of which we are speaking. It was one of the wisest points in the Portuguese policy, that, though they were really in possession of this beneficial commerce, yet they chose to dissemble it, and took all imaginable precautions in order to make the natives believe that they were perfectly free, and that their interposition was not so much the effects of authority as of good-will; it was for this reason that they never pretended to erect any fort either at Tutucorin or at Calipatnam, two towns, upon the continent, from whence most of the fishers and their barks came, and that they suffered the ancient customs to take place.

The season of the fishery was the latter end of April or beginning of May, sometimes sooner, sometimes later, according to the weather. The direction of it was left entirely to the sovereign of the country, called the *naik*; and the Portuguese, in quality of the protectors of the sea, sent two frigates to defend the fishing-vessels from the Malabar and Maldivé pirates. The time which this pearl-fishing lasted was about a fortnight, of the beginning of which the *naik* gave public notice; and, the day being come, there repaired to the place assigned several thousands of people of all sexes and ages, and an indefinite number of fishing vessels, and divers from five or six hundred to a thousand or more. Upon a signal given the boats put to sea; and, having chose their proper stations, the divers plunged and brought up the oy-

sters in little baskets upon their heads; with which the boats being sufficiently laden, they were carried on shore, where the people who remained there for that purpose buried them in the sand, till, by the heat of the sun, the fish was corrupted and consumed, and the pearls easily taken out. The whole conduct of the first day's fishery belonged to the *naik*; and, after that deduction, what was caught every day was separated, and particularly distinguished, but went to the common profit. The whole number of the people employed at sea and on shore amounted frequently to 50,000 or 60,000 souls; and the pavilions and tents set up for their accommodation made a fine appearance at a distance. When the pearls were extracted, cleaned, and dried, they passed them through a kind of sieves, by which their sizes were distinguished. When all was over, the *naik* appointed a time and place for the public market; in consequence of which there was a kind of fair, that lasted commonly from the close of June till the beginning of September. The smallest, which are what we call *seed-pearl*, they sold by weight, and all the rest according to their respective sizes and beauty, from a few shillings up to ten or twenty pounds, and sometimes more a-piece; but there were few buyers, except the Portuguese merchants, who, bringing ready money, had got bargains, and thus all parties were pleased. The Portuguese assumed the protection of this fishery very soon after they settled in the Indies, and held it till the year 1658, when, in consequence of their losses in Ceylon and elsewhere, it fell into the hands of the Dutch, who have remained in possession of it ever since.

The Dutch have changed this method, as we are informed by a person very well acquainted with their affairs. The course into which they have put it is, in few words, this: the camp is sometimes held on the coast of Madura, upon the continent; sometimes on the island of Manar, which is in the hands of the Dutch, who, notwithstanding, follow the example of the Portuguese, and lay claim to no higher title than that of protectors of the fishery, in which quality their commissary is ever in the camp, as well as the *naik* or sovereign of the country, who is also the *rajah* of Tanjour. The oysters caught every day are put up in tuns or barrels, of which, when a certain number are full, they put them up to sale by way of auction; and the merchants bid according as they have an opinion of the oysters for the season: but the middle price is between 30 and 40 shillings sterling per cask. When a merchant has bought such a lot as this, he carries it to his quarters; and after a certain number of days he proceeds to opening the oysters, but always in the air, for the stench is so great as to be almost insupportable. They open them over tubs, into which they pour what comes out of the oyster, as also that muddy water that remains in the cask; next they draw it out into cullenders of several sizes, and at length perhaps they find four or five shillings worth of pearls, sometimes to the value of ten or twelve pounds; so that it is a perfect lottery, by which some few becoming rich, it betrays numbers into beggary. This pearl-fishery, we are told, brings the Dutch company an annual tribute of 20,000 l.

There are a variety of rivers, great and small in Eastern Tartary considerable for pearl-fishery; but these

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Pearl. these pearls, though much esteemed by the Tartars, would be little valued by Europeans, on account of their defects in shape and colour. The Emperor Kang-hi had several chaplets or strings of these pearls, each containing 100, which were very large, and exactly matched. There are many rivulets in Livonia which produce pearls almost equal in size and clearness to the Oriental ones. There are several fisheries both on the eastern and western coasts of Africa; the most considerable of which lie round some small islands, over-against the kingdom of Sofala; but the people thus employed, instead of exposing the oysters to the warmth of the sun, which would induce them to open, lay them upon the embers; by which absurd method, those pearls which they catch contract a dull kind of redness, which robs them of their natural lustre as well as of their value. Pearl-fishing is performed by the women as well as the men; both being equally expert. In the sea of California also there are very rich pearl-fisheries. In Japan likewise there are found pearls of great price. Pearls are met with in all parts of the Red Sea in the Indian Ocean, on the low part of the coast of Arabia Felix named *Baharen*, adjoining to the Persian Gulf. They are likewise found on the low coast about Gunibroom to the eastward of the Persian Gulf; and many of the finest kind are met with on the coasts of Ceylon. They are most plentiful in the Baharen, between the coast of Arabia Felix and Ormus, whence they are transported to Aleppo, then sent to Leghorn, and then circulated through Europe.

It has been very commonly supposed, that pearls are found in a kind of oysters; and such the pearl fishes are called in part of the above account extracted from the Universal History; but Mr Bruce absolutely denies this, and informs us that there is no such fish as an oyster to be met with in the Red Sea in particular. They are indeed found in bivalve shells, of which there are three kinds commonly sought after by the pearl fishers. One of these is a kind of muscle now very rare; but whether more plentiful formerly than at present is not known; they are principally found in the north end of the Red Sea and on the Egyptian side; and Mr Bruce informs us, that the only place in which he ever met with them was about Cossair, and to the northward of it, where there was an ancient port called *Myos Hermos*, "which (says Mr Bruce) commentators have called the port of the *Moufe*, when they should have translated it the harbour of the *Muscle*."

The second sort of shell is called *Pinna*. It is broad and semicircular at the top, decreasing gradually until it turns sharp at the lower end, where the hinge is. The outside is rough and figured, of a beautiful red colour, and sometimes three feet long, and extremely brittle; the inside lined with that beautiful substance called *nacre*, or mother-of-pearl.

The third kind of Pearl-shell is the only one which can be said to bear any resemblance to the oyster; though even this is evidently of a different genus.

In a general view of the writings of Linnæus by Richard Pulteney, M. D. p. 42. it is said that Linnæus made a remarkable discovery relating to the generation of pearls: in the river pearl-muscle (*mya margaritifera*) a shell fish found in several rivers of Great

Britain and Ireland; that this fish will bear removal remarkably well; and that in some places they form reservoirs for the purpose of keeping it, and taking out the pearl, which in a certain period will be renewed again. The discovery was a method which Linnæus found of putting these muscles into a state of producing pearls at his pleasure, though the final effect did not take place for several years; but that in five or six years after the operation, the pearl would have acquired the size of a vetch. Dr Pulteney regrets that we are unacquainted with the means by which Linnæus accomplished this extraordinary operation, which was considered as important, since it is certain the author was rewarded with a munificent premium from the states of the kingdom on that account.

The colours of pearls are different according to the shells in which they are found. The first kind often produces those of a fine shape and excellent lustre, but seldom of that very fine colour which enhances their price. The second kind produces pearls having the reddish cast of the inner shell of the *pinna*, called *mother of pearl*; which seems to confirm the opinion of Reaumur, that the pearls are formed from the glutinous fluid which makes the first rudiments of the shell; and this kind of pearl is found to be more red as it is formed nearer the broad part of the shell, which is redder than the other end. Mr Bruce is of opinion, that the pearl found in this shell is the *penim* or *peninim* of Scripture; and that this name is derived from its redness. "On the contrary (says he), the word *pinna* has been idly imagined to be derived from *penna*, a feather; as being broad and round at the top, and ending at a point, or like a quill below. The English translation of the Scripture, erroneous and inaccurate in many things more material, translates this *peninim* by rubies, without any foundation or authority but because they were both red, as are bricks or tiles, and many other things of base materials. The Greeks have translated it literally *pina* or *pinna*, and the shell they call *pinnicus*; and many places occur in Strabo, Theophrastus, Elian, and Ptolemy, which are mentioned as famous for this kind of pearl. I should imagine also, that by Solomon saying it is the most precious of all productions, he means that this species of pearl was the most valued or the best known in Judæa; for though we learn from Pliny that the excellency of pearls was their whiteness, yet we know that the pearls of a yellowish cast are those esteemed in India to this day, as the *peninim* or reddish pearl was in Judea in the days of Solomon. In Job, where all the variety of precious stones are mentioned, the translator is forced, as it were unwillingly, to render *peninim* pearls, as he ought indeed to have done in many other places where it occurs."

The third sort of shell produces pearls of extreme whiteness, which Bochart says are called *darra* or *dora* in Arabic; which seems to be a general term for all kinds of pearls in Scripture, whereas the *peninim* is one in particular. But though the character of this pearl be extreme whiteness, we are told by Pliny that there are shades or differences of it. The clearest, he says, are those of the Red Sea; but the pearls of India have the colour of the flakes or divisions of the lapis specularis. The most excellent are those like a solution

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of alum, limpid, milky-like, and even with a certain almost imperceptible cast of a fiery colour. Theophrastus tells us, that these pearls are transparent, as the description of Pliny would lead us to imagine; but it is not so: and if they were, it is apprehended they would lose all their beauty and value, and approach too much to glass. The value of these commodities depends upon their size, regularity of form, whether round or not, weight, smoothness, colour, and the different shades of that colour. The pearl fishers say, that when the shell is smooth and perfect, they never expect to find any pearls, but always do so when it has begun to be deformed and distorted. Hence it would seem, that as the fish turned older, the vessels containing the juice for forming the shell, and keeping it in its vigour, grew weak and ruptured; and thence, from this juice accumulating in the fish, the pearl was formed, and the shell brought to decay, as supposed by Mr Reaumur. If this be the case, it ought to be known by the form of the shell whether the pearl is large or small; and thus the smaller ones being thrown back into the sea, a constant crop of large pearls might be obtained.

Pliny says that pearls are the most valuable and excellent of all precious stones; and from our Saviour's comparing the kingdom of heaven to a pearl, it would seem that they really were held in such high estimation at that time. Mr Bruce, however, is of opinion, that this extraordinary value was put only upon the very large kind; of which we are told, that Servilia, the mother of Marcus Brutus, presented one to Cæsar of the value of 50,000 l. of our money; and Cleopatra dissolved one worth 250,000 l. in vinegar, which she drank at a supper with Mark Antony.

It is generally said that the pearl shells grow on rocks, which, together with the method of catching them, we have already mentioned. Some say they are taken with nets: from whence Mr Bruce contraverts the idea of their growing on rocks; for nobody, he says, would employ nets to gather fish from among rocks. He tells us, that all kinds of them are found in the deepest and stillest water, and softest bottom; the parts of most of them being too fine to bear the agitation of the sea among the rocks. It is observed that they produce the most beautiful pearls in those places of the sea where a quantity of fresh water falls. "Thus (says Mr Bruce), in the Red Sea, they are always most esteemed that were fished from Suakern southward, that is, in those parts corresponding to the country anciently called *Berberia* and *Azamia*; on the Arabian Coast, near the island Camaran, where there is abundance of fresh water; and in the island of Foosht. As it is a fish that delights in repose, I imagine it avoids this part of the Gulf, as lying open to the Indian Ocean, and agitated by variable winds."

Mr Bruce mentions a muscle found in the salt springs of the Nubian desert; in many of which he found those excrescences which might be called pearls,

but all of them ill formed, foul, and of a bad colour, though of the same consistence, and lodged in the same part of the body as those in the sea. "The muscle, too (says our author), is in every respect similar, I think larger. The outer skin or covering of it is of a vivid green. Upon removing this, which is the epidermis, what next appears is a beautiful pink, without gloss, and seemingly of a calcareous nature. Below this, the mother-of-pearl, which is undermost, is a white without lustre, partaking much of the blue and very little of the red; and this is all the difference I observed between it and the pearl-bearing muscle of the Red Sea."

"In Scotland, especially to the northward (A), in all rivers running from lakes, there are found muscles that have pearls of more than ordinary merit, though seldom of large size. They were formerly tolerably cheap, but lately the wearing of real pearls coming into fashion, those of Scotland have increased in price greatly beyond their value, and superior often to the price of oriental ones when bought in the east. The reason of this is a demand from London, where they are actually employed in work, and sold as oriental. But the excellency of all glass or paste manufactory, it is likely, will keep the price of this article, and the demand for it, within bounds, when every lady has it in her power to wear in her ears, for the price of sixpence, a pearl as beautiful in colour, more elegant in form, lighter and easier to carry, and as much bigger as she pleases, than the famous ones of Cleopatra and Servilia. In Scotland, as well as in the east, the smooth and perfect shell rarely produces a pearl; the crooked and distorted shell seldom wants one.

The mother-of-pearl manufactory is brought to the greatest perfection at Jerusalem. The most beautiful shell of this kind is that of the peninim already mentioned; but it is too brittle to be employed in any large pieces of workmanship; whence that kind named *dora* is most usually employed; and great quantities of this are daily brought from the Red Sea to Jerusalem. Of these, all the fine works, the crucifixes, the wafer-boxes, and the beads, are made, which are sent to the Spanish dominions in the New World, and produce a return incomparably greater than the staple of the greatest manufactory in the Old.

Very little is known of the natural history of the pearl fish. Mr Bruce says, that, as far as he has observed, they are all stuck upright in the mud by an extremity; the muscle by one end, the pinna by the small sharp point, and the third by the hinge or square part which projects from the round. "In shallow and clear streams (says Mr Bruce), I have seen small furrows or tracks upon the sandy bottom, by which you could trace the muscle from its last station; and these not straight, but deviating into traverses and triangles, like the course of a ship in a contrary wind laid down upon a map, probably in pursuit of food. The general belief is, that the muscle is constantly stationary in a state of repose, and cannot transfer itself from place to place."

(A) There has been in these parts (*i. e.* at Perth) a very great fishery of pearl got out of the fresh-water muscles. From the year 1761 to 1764, 10,000 l. worth were sent to London, and sold from 10s. to 1l. 16s. per ounce. We were told that a pearl had been taken there that weighed 33 grains. But this fishery is at present exhausted, from the avarice of the undertakers: it once extended as far as Loch-Tay.

Pearl. to place. This is a vulgar prejudice, and one of those facts that are mistaken for want of sufficient pains or opportunity to make more critical observations. Others, finding the first opinion a false one, and that they are endowed with power of changing place like other animals, have, upon the same foundation, gone into the contrary extreme, so far as to attribute swiftness to them, a property surely inconsistent with their being fixed to rocks. Pliny and Solinus say that the muscels have leaders, and go in flocks; and that their leader is endowed with great cunning to protect himself and his flock from the fishers; and that, when he is taken, the others fall an easy prey. This, however, we may justly look upon to be a fable; some of the most accurate observers having discovered the motion of the muscel, which indeed is wonderful, and that they lie in beds, which is not at all so, have added the rest, to make their history complete." Our author informs us, that the muscels found in the salt springs of Nubia likewise travel far from home, and are sometimes surprised, by the ceasing of the rains, at a greater distance from their beds than they have strength and moisture to carry them. He assures us, that none of the pearl-fish are eatable; and that they are the only fish he saw in the Red Sea that cannot be eaten.

Artificial PEARLS. Attempts have been made to take out stains from pearls, and to render the foul opaque-coloured ones equal in lustre to the oriental. Abundance of processes are given for this purpose in books of secrets and travels; but they are very far from answering what is expected from them. Pearls may be cleaned indeed from any external foulnesses by washing and rubbing them with a little Venice soap and warm water, or with ground rice and salt, with starch and powder-blue, plaster of Paris, coral, white vitriol and tartar, cuttle-bone, pumice-stone, and other similar substances; but a stain that reaches deep into the substance of pearls is impossible to be taken out. Nor can a number of small pearls be united into a mass similar to an entire natural one, as some pretend.

There are, however, methods of making artificial pearls, in such manner as to be with difficulty distinguished from the best oriental. The ingredient used for this purpose was long kept a secret; but it is now discovered to be a fine silver-like substance found upon the under side of the scales of the blay or bleak fish. The scales, taken off in the usual manner, are washed and rubbed with fresh parcels of fair water, and the several liquors suffered to settle: the water being then poured off, the pearly matter remains at the bottom, of the consistence of oil, called by the French *essence d'orient*. A little of this is dropped into a hollow bead of bluish glass, and shaken about so as to line the internal surface; after which the cavity is filled up with wax, to give solidity and weight. Pearls made in this manner are distinguishable from the natural only by their having fewer blemishes.

Mother-of-PEARL, the shell, not of the pearl oyster, but of the *mytilus margaritifera*. See MYTILUS.

PEARL-ASH, a kind of fixed alkaline salt, prepared chiefly in Germany, Russia, and Poland, by melting the salts out of the ashes of burnt wood; and having reduced them again to dryness, evaporating the moisture, and calcining them for a considerable time in a furnace moderately hot. The goodness of pearl-ashes

must be distinguished by the uniform and white appearance of them: they are nevertheless subject to a common adulteration, not easy to be distinguished by the mere appearance, which is done by the addition of common salt. In order to find out this fraud, take a small quantity of the suspected salt; and after it has been softened by lying in the air, put it over the fire in a shovel: if it contains any common salt, a crackling and kind of slight explosion will take place as the salt grows hot.

Pearl-ashes are much used in the manufacture of glass, and require no preparation, except where very great transparency is required, as in the case of looking-glasses, and the best kind of window-glass. For this purpose dissolve them in four times their weight of boiling water: when they are dissolved, let the solution be put into a clean tub, and suffered to remain there 24 hours or more. Let the clear part of the fluid be then decanted off from the sediment, and put back into the iron pot in which the solution was made; in this let the water be evaporated till the salts be left perfectly dry. Keep those that are not designed for immediate use in stone jars, well secured from moisture and air.

Mr Kirwan, who has tried a course of experiments on the alkaline substances used in bleaching, &c. (see *Irisb Transf.* for 1789), tells us, that in 100 parts of the Dantzick pearl-ash, the vegetable alkali amounted to somewhat above 63. His pearl-ash he prepares by calcining a ley of vegetable ashes dried into a salt to whiteness. In this operation, he says, "particular care should be taken that it should not melt, as the extractive matter would not be thoroughly consumed, and the alkali would form such a union with the earthy parts as could not easily be dissolved." He has "added this caution, as Dr Lewis and Mr Dossie have inadvertently directed the contrary." We apprehend, however, that here is a little inaccuracy; and that it was not for pearl-ash, but for the unrefined pot-ash, that these gentlemen directed fusion. The fact is, that the American pot-ashes, examined by them, had unquestionably suffered fusion: which was effected in the same iron pot in which the evaporation was finished, by rather increasing the fire at the end of the process: by this management, one of the most troublesome operations in the whole manufacture, the separation of the hard salt from the vessels with hammers and chisels, was avoided; and though the extractive matter was not consumed, it was burnt to an indissoluble coal; so that the salt, though black itself, produced a pale or colourless solution, and was uncommonly strong. Mr Kirwan has also given tables of the quantities of ashes and salt obtained from different vegetables; and he concludes from them, 1. "That in general weeds yield much more ashes, and their ashes much more salt, than woods; and that, consequently, as to salts of the vegetable alkali kind, neither America, Trieste, nor the northern countries, possess any advantage over us. 2. That of all weeds, fumitory produces most salt, and next to it wormwood; but if we attend only to the quantity of salt in a given weight of ashes, the ashes of wormwood contain most. *Trifolium fibrinum* also produces more ashes and salt than fern." See POTASH.

PEARSON (John), a very learned English bishop

Pearl,
Pearson.

Pearson,
Peasant.

in the 17th century, was born at Snoring in 1613. After his education at Eton and Cambridge, he entered into holy orders in 1639, and was the same year collated to the prebend of Netherhaven in the church of Sarum. In 1640 he was appointed chaplain to the lord keeper Finch, and by him presented to the living of Torrington in Suffolk. In 1650 he was made minister of St Clement's, East-cheap, in London. In 1657, he and Mr Gunning had a dispute with two Roman Catholics upon the subject of schism; a very unfair account of which was printed at Paris in 1658. Some time after, he published at London An Exposition of the Creed, in folio, dedicated to his parishioners of St Clement's, East-cheap, to whom the substance of that excellent work had been preached several years before, and by whom he had been desired to make it public. The same year he likewise published The Golden Remains of the ever memorable Mr John Hales of Eton; to which he prefixed a preface, containing, of that great man, with whom he had been acquainted for many years, a character drawn with great elegance and force. Soon after the Restoration, he was presented by Juxon, then bishop of London, to the rectory of St Christopher's in that city; created doctor of divinity at Cambridge, in pursuance of the king's letters mandatory; installed prebendary of Ely; archdeacon of Surry; and made master of Jesus college in Cambridge: all before the end of the year 1660. March 25th 1661, he was appointed Margaret professor of divinity in that university; and, the first day of the ensuing year, was nominated one of the commissioners for the review of the liturgy in the conference at the Savoy. April 14th 1662, he was admitted master of Trinity college in Cambridge; and, in August, resigned his rectory of St Christopher's and prebend of Sarum. — In 1667 he was admitted a Fellow of the Royal Society. In 1672 he published at Cambridge, in 4to, *Vindiciæ Epistolæ S. Ignatii*, in answer to Mons. Daillé; to which is subjoined, *Isaaci Vossii epistolæ duæ adversus Davidem Blondellum*. Upon the death of the celebrated Wilkins, Pearson was appointed his successor in the see of Chester, to which he was consecrated February 9th 1672-3. In 1682, his *Annales Cyprianici, sive tredecim annorum, quibus S. Cyprian. inter Christianos versatus est, historia chronologica*, was published at Oxford, with Fell's edition of that Father's works. Pearson was disabled from all public service by ill health a considerable time before his death, which happened at Chester, July 16th 1686.

PEASANT, a hind, one whose business is in rural labour.

It is amongst this order of men that a philosopher would look for innocent and ingenuous manners. The situation of the peasantry is such as secludes them from the devastations of luxury and licentiousness; for when the contagion has once reached the recesses of rural retirement, and corrupted the minds of habitual innocence, that nation has reached the summit of vice, and is hastening to that decay which has always been the effect of vicious indulgence. The peasantry of this country still in a great measure retain that simplicity of manners and rustic innocence which ought to be the characteristic of this order of society; and, in many parts, their condition is such as, were all its advantages sufficiently known, would create envy in the minds of

those who have toiled through life, amidst the bustle of the world, in quest of that happiness which it could not confer.

*O fortunatos nimium, sua si bona norint,
Agricolæ.* —

Virgil.

In other countries the peasants do not enjoy the same liberty as they do in our own, and are consequently not so happy. In all feudal governments they are abject slaves, entirely at the disposal of some petty despot. This was the case in Poland, where the native peasants were subject to the most horrid slavery, though those descended of the Germans, who settled in Poland during the reign of Boleslaus the Chaste and Cassimir the Great, enjoyed very distinguished privileges. Amongst the native slaves, too, those of the crown were in a better condition than those of individuals. See POLAND.

The peasants of Russia (Mr Coxe tells us) are a hardy race of men, and of great bodily strength. Their cottages are constructed with tolerable propriety, after the manner of those in Lithuania; but they are very poorly furnished. The peasants are greedy of money, and, as the same author informs us, somewhat inclined to thieving. They afford horses to travellers, and act the part of coachmen and postilions. “In their common intercourse they are remarkably polite to each other: they take off their cap at meeting; bow ceremoniously and frequently, and usually exchange a salute. They accompany their ordinary discourse with much action, and innumerable gestures; and are exceedingly servile in their expressions of deference to their superiors: in accosting a person of consequence, they prostrate themselves, and even touch the ground with their heads. We were often struck at receiving this kind of eastern homage, not only from beggars, but frequently from children, and occasionally from some of the peasants themselves.

Coxe's Travels into Poland, Russia, Sweden, and Denmark.

“The peasants are well clothed, comfortably lodged, and seem to enjoy plenty of wholesome food. Their rye-bread, whose blackness at first disgusts the eye, and whose sourness the taste, of a delicate traveller, agrees very well with the appetite; as I became reconciled to it from use, I found it at all times no unpleasant morsel, and, when seasoned with hunger, it was quite delicious: they render this bread more palatable, by stuffing it with onions and groats, carrots or green corn, and seasoning it with sweet oil. The rye-bread is sometimes white, and their other articles of food are eggs, salt-fish, bacon, and mushrooms; their favourite dish is a kind of hodge podge, made of salt, or sometimes fresh meat, groats, rye-flour, highly seasoned with onions and garlick, which latter ingredients are much used by the Russians. Besides, mushrooms are so exceedingly common in these regions, as to form a very essential part of their provision. I seldom entered a cottage without seeing great abundance of them; and in passing through the markets, I was often astonished at the prodigious quantity exposed for sale: their variety was no less remarkable than their number; they were of many colours, amongst which I particularly noticed white, black, brown, yellow, green, and pink. The common drink of the peasants is quass, a fermented liquor, somewhat like sweet-wort, made by pouring warm water on rye

Peasant. or barley-meal; and deemed an excellent antiscorbutic. They are extremely fond of whisky, a spirituous liquor distilled from malt, which the poorest can occasionally command, and which their inclination often leads them to use to great excess."

These people are extremely backward in the mechanic arts, though, where they have much intercourse with other nations, this does not appear, and therefore does not proceed from natural inability; indeed we have already given an instance of one peasant of Russia, who seems to possess very superior talents. See NEVA.

The dress of these people is well calculated for the climate in which they live: they are particularly careful of their extremities. On their legs they wear one or two pair of thick worsted stockings; and they envelope their legs with wrappers of coarse flannel or cloth several feet in length, and over these they frequently draw a pair of boots, so large as to receive their bulky contents with ease. The lower sort of people are grossly ignorant; of which we shall give a very surprising instance in the words of Mr Coxe:—

"In many families, the father marries his son while a boy of seven, eight, or nine years old, to a girl of a more advanced age, in order, as it is said, to procure an able-bodied woman for the domestic service: he cohabits with this person, now become his daughter-in-law, and frequently has several children by her. In my progress through Russia, I observed in some cottages, as it were, two mistresses of a family; one the peasant's real wife, who was old enough to be his mother; and the other, who was nominally the son's wife, but in reality the father's concubine. These incestuous marriages, sanctified by inveterate custom, and permitted by the parish-priests, were formerly more common than they are at present; but as the nation becomes more refined, and the priests somewhat more enlightened; and as they have lately been discountenanced by government, they are daily falling into disuse; and, it is to be hoped, will be no longer tolerated (A)."

The peasants of Russia, like those of Poland, are divided into those of the crown and those of individuals; the first of which are in the best condition; but all of them undergo great hardships, being subject to the despotic will of some cruel overseer. They may obtain freedom, 1. By manumission on the death of their master, or otherwise: 2. By purchase; and, lastly, By serving in the army or navy. The Empress has redressed some of the grievances of this class of her

Peasant. subjects. The hardness of the peasants arises in a great measure from their mode of education and way of life, and from the violent changes and great extremes of heat and cold to which they are exposed.

"The peasants of Finland differ widely from the Russians in their look and dress: they had for the most part fair complexions, and many of them red hair: they shave their beards, wear their hair parted at the top, and hanging to a considerable length over their shoulders (B). We could not avoid remarking, that they were in general more civilized than the Russians; and that even in the smallest villages we were able to procure much better accommodations than we usually met with in the largest towns which we had hitherto visited in this empire."

The peasants of Sweden (Mr Coxe informs us) are more honest than those in Russia; in better condition, and possessing more of the conveniences of life, both with respect to food and furniture. "They are well clad in strong cloth of their own weaving. Their cottages, though built with wood, and only of one story, are comfortable and commodious. The room in which the family sleep is provided with ranges of beds in tiers (if I may so express myself), one above the other: upon the wooden testers of the beds in which the women lie, are placed others for the reception of the men, to which they ascend by means of ladders. To a person who has just quitted Germany, and been accustomed to tolerable inns, the Swedish cottages may perhaps appear miserable hovels; to me, who had been long used to places of far inferior accommodation, they seemed almost palaces. The traveller is able to procure many conveniences, and particularly a separate room from that inhabited by the family, which could seldom be obtained in the Polish and Russian villages. During my course through those two countries, a bed was a phenomenon which seldom occurred, excepting in the large towns, and even then not always completely equipped; but the poorest huts of Sweden were never deficient in this article of comfort: an evident proof that the Swedish peasants are more civilized than those of Poland and Russia.—After having witnessed the slavery of the peasants in those two countries, it was a pleasing satisfaction to find myself again among freemen, in a kingdom where there is a more equal division of property; where there is no vassalage; where the lowest order enjoy a security of their persons and property; and where the advantages resulting from this right are visible to the commonest observer."

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(A) "The truth of this fact, which fell under my own observation, and which I authenticated by repeated inquiries from all ranks of people, is still further confirmed by the following passage in the Antidote to the Journey into Siberia, although the author gives another reason for those early marriages. 'The peasants and common people not only marry their sons at 14 and 15 years of age, but even at eight or nine, and that for the sake of having a workwoman the more in the person of the son's wife: By the same rule, they try to keep their daughters single as long as possible, because they don't choose to lose a workwoman. These premature marriages are of very little use to the state; for which reason, methods to get the better of this custom have been sought for, and, I hope, will soon take place: the bishops are attentive to prevent these marriages as much as possible, and have of late succeeded greatly in their endeavours. It is only the inhabitants of some of the provinces in Russia that still retain this bad custom.'"

(B) The Russians have generally dark complexions and hair: they also wear their beards, and cut their hair short.

Peat.

The peasants of Holland and Switzerland are all in a very tolerable condition; not subject to the undisputed controul of a hiring master, they are freemen, and enjoy in their several stations the blessings of freedom. In Bohemia, Hungary, and a great part of Germany, they are legally slaves, and suffer all the miseries attending such a condition. In Spain, Savoy, and Italy, they are little better. In France, their situation was such as to warrant the first Revolution; but by carrying matters too far, they are now infinitely worse than they were at any former period.

PEAT, a well known inflammable substance, used in many parts of the world as fuel. There are two species:

1. A yellowish-brown or black peat, found in moorish grounds in Scotland, Holland, and Germany.—When fresh, it is of a viscid consistence, but hardens by exposure to the air. It consists, according to Kirwan, of clay mixed with calcareous earth and pyrites; sometimes also it contains common salt. While soft, it is formed into oblong pieces for fuel, after the pyritaceous and stony matters are separated. By distillation it yields water, acid, oil, and volatile alkali; the ashes containing a small proportion of fixed alkali; and being either white or red according to the proportion of pyrites contained in the substance.

The oil which is obtained from peat has a very pungent taste; and an empyreumatic smell, less fetid than that of animal substances, more so than that of mineral bitumens: it congeals in the cold into a pitchy mass, which liquefies in a small heat: it readily catches fire from a candle, but burns less vehemently than other oils, and immediately goes out upon removing the external flame: it dissolves almost totally in rectified spirit of wine into a dark brownish red liquor.

2. The second species is found near Newbury in Berkshire. In the Philosophical Transactions for the year 1757, we have an account of this species; the substance of which is as follows:

Peat is a composition of the branches, twigs, leaves, and roots of trees, with grass, straw, plants, and weeds, which having lain long in water, is formed into a mass so soft as to be cut through with a sharp spade. The colour is a blackish brown, and it is used in many places for firing. There is a stratum of this peat on each side the Kennet, near Newbury in Berks, which is from about a quarter to half a mile wide, and many miles long. The depth below the surface of the ground is from one foot to eight. Great numbers of entire trees are found lying irregularly in the true peat. They are chiefly oaks, alders, willows, and firs, and appear to have been torn up by the roots: many horses heads, and bones of several kinds of deer; the horns of the antelope, the heads and tusks of boars, and the heads of beavers, are also found in it. Not many years ago an urn of a light brown colour, large enough to hold about a gallon, was found in the peat-pit in Speen moor, near Newbury, at about 10 feet from the river, and four feet below the level of the neighbouring ground. Just over the spot where the urn was found, an artificial hill was raised about eight feet high; and as this hill consisted both of peat and earth, it is evident that the peat was older than the urn. From

Peat.

the side of the river several semicircular ridges are drawn round the hill, with trenches between them. The urn was broken to shivers by the peat-diggers who found it, so that it could not be critically examined; nor can it be known whether any thing was contained in it.

With peat also may be classed that substance called in England stone-turf; which hardens after its first exposure to the air, but afterwards crumbles down.—The other common turf consists only of mould interwoven with the roots of vegetables; but when these roots are of the bulbous kind, or in large proportion, they form the worst kind of turf. “Although it may appear incredible (says M. Magellan), it is nevertheless a real fact, that, in England, pit-turf is advantageously employed in Lancashire to smelt the iron-ore of that county. Mr Wilkinson, brother-in-law to Dr Priestley, makes use of pit-turf in his large smelting furnaces. I have seen in the possession of Mr S. More, secretary to the Society of Arts, a kind of black tallow, extracted by the said Mr Wilkinson from pit-turf. It was very soft, and nearly of the same consistence with butter. It burnt very rapidly, with a smoky flame in the fire; but the smell was very disagreeable, like that of pit-turf.” The great cause of the differences of peat most likely arises from the different mineral admixtures. Some sorts of peat yield in burning a very disagreeable smell, which extends to a great distance; whilst others are inoffensive.—Some burn into grey or white, and others into red ferruginous ashes. The ashes yield, on elixation, a small quantity of alkaline salt, with sometimes one and sometimes another salt of the neutral kind.

The smoke of peat does not preserve or harden flesh like that of wood; and the foot, into which it condenses, is more disposed to liquefy in moist weather.

Peat ashes, properly burnt for a manure, are noble improvers both of corn and grass land: but the substance from which they should be got is an under stratum of the peat, where the fibres and roots of the earth, &c. are well decayed. Indeed the very best are procured from the lowest stratum of all. This will yield a large quantity of very strong ashes, in colour (when first burnt) like vermilion, and in taste very salt and pungent. Great care and caution should be used in burning these ashes, and also in preserving them afterwards. The method of burning them is much the same as burning charcoal. The peat must be collected into a large heap, and covered so as not to flame out, but suffered to consume slowly, till the whole substance is burnt to an ash. The ashes thus burnt are held in most esteem; but the peat-ashes burnt in common firing are in many places used for the same purposes, and sold at the same prices.

Peat ashes are found excellent in sweetening four meadow land, destroying rushes, and other bad kinds of grass, and in their stead producing great quantities of natural grass. They burn great quantities of peat-ashes in some parts of Berkshire and Lancashire, and esteem them one of the best dressings for their spring crops.

The sulphureous and saline particles with which the ashes abound have a most happy effect in promoting vegetation; and if used with discretion, the increase procured by them is truly wonderful.

All

Peat.

All ashes are of a hot, fiery, caustic nature: they must therefore be used with caution. With respect to peat-ashes, almost the only danger proceeds from laying them on in too great quantities at improper seasons. Nothing can be better than they are for dressing low damp meadows, laying to the quantity of from fifteen to twenty Winchester bushels on an acre: it is best to sow them by hand, as they will then be more regularly spread. This should be done in January or February at latest, that the ashes may be washed in towards the roots of the grass by the first rains that fall in the spring.

If they were spread more forward in the year, and a speedy rain should not succeed, being hot in their nature, they would be apt to burn up the grass, instead of doing it any service. The damper and stiffer the soil, the more peat-ashes should be laid on it; but in grass lands the quantity should never exceed thirty Winchester bushels, and on light warm lands less than half that quantity is fully sufficient.

On wheat crops these ashes are of the greatest service, but they must be laid on with the utmost discretion. Were they to be spread in any quantity before the winter, after the sowing the corn, they would make the wheat too rank, and do more harm than good; was the spreading this manure, on the contrary, deferred till the spring, the corn could not possibly during the winter season be benefited by it. About the beginning of November, before the hard frosts set in, seems to be the proper season for this purpose: and it will be found necessary to sow on every acre of heavy clayey wheat land about eight Winchester bushels of these ashes; on lighter warmer lands in wheat, four will be sufficient for this season. The winter dressing is thought by practical farmers to be of great service: trifling as the quantity may seem, it warms the root of the plants, brings it moderately forward, preserves its verdure, and disposes it to get into a growing state the first fine weather after Christmas.

About the latter end of February, or the beginning of March, on heavy lands in wheat, another dressing of ashes, by sowing of them on every acre eight bushels more, will do much good; on light lands, in this second dressing, six bushels may be allowed.

These ashes laid on in the spring are of the greatest service, without any probability of danger: if rain falls within a few days after the dressing is laid on, it is washed in, and has a happy effect on the succeeding crop, co-operating with the manure that was laid on in November; if, on the contrary, dry weather for a long continuance succeeds, the first winter-dressing has its full effect, and the quantity laid on in the spring is in fact so small, that there is very little probability of its burning or hurting the crop. This excellent manure is also of great use in the turnip husbandry on many accounts, particularly as it much contributes to preserve the young crop from being devoured by the fly.

But one of the principal advantages derived from these ashes, not yet mentioned, is the very great service they are of to every kind of artificial pasture.

Saintfoin receives great benefit from this manure, and so does clover, rye-grass, and trefoil, provided it is laid on with discretion: the proper season is about the month of February. The quantity must be regulated by the nature of the crop and soil; but it ought

scarcely in any instance to exceed thirty Winchester bushels. Clover, with the help of this manure, grows with great luxuriance, insomuch that there have often been two large crops of hay from the same field in a year, and good autumn feed afterwards. They have an excellent effect on tares or vetches: to pease they seem to be hurtful.

The effects of this manure will be visible at least three years, nor does it, like some others, leave the land in an impoverished state, when its virtues are exhausted and spent. Peat-ashes are not, however, so certain a manure for barley and oats as for the winter corn: for as these are quick growers, and occupy the land but a few months, this warm manure is often apt to push them forward too fast, and make them run too much to coarse straw, yielding only a lean immature grain. Oats, however, are not so apt to be damaged by it as barley.

Peat-ashes approach, in their effects on the several crops on which they are laid, to coal-foot; but two-thirds of the quantity that is used of foot will be sufficient of the ashes, as they are in a much stronger degree impregnated with a vegetative power; and they are besides in most places easier procured in quantities, and at a cheaper rate.

Peat-ashes are almost, as we have already observed, a general manure suited to every soil. On cold clay they warm the too compact particles, dispose it to ferment, crumble, and of course fertilize, and, in fine, not only assist it in disclosing and dispensing its great vegetative powers, but also bring to its aid a considerable proportion of ready prepared aliment for plants. On light lands these ashes have a different effect: here the pores are too large to be affected, or farther separated by the salts or sulphur contained in them; but, being closely attached to the surfaces of the large particles of which this earth is generally composed, this manure disposes them, by means of its salts, to attract the moisture contained in the air: by this operation, the plants which grow on these porous soils are prevented from being scorched up and burnt; and if they want, which they generally do, more nourishment than the land is of itself capable of affording, this is readily and abundantly supplied by this useful manure. In large farms it is very usual to see all the home-fields rich and well mended by the yard dung, &c. whereas the more distant lands are generally poor, impoverished, and out of heart, for want of proper manure being applied in time. See CHEMISTRY, n^o 1448.

PEAUCIER, in anatomy, a name given by Winslow, in his Treatise on the Head, and by some of the French writers, to the muscle called by Albinus *latissimus colli*; and by others *dehrens quadratus*, and *quadratus gene*. Santorini has called the part of this which arises from the cheek *musculus risorius novus*; and some call the whole *platysma myoides*.

PEBBLES, the name of a genus of fossils, distinguished from the flints and homocroa by their having a variety of colours. These are defined to be stones composed of a crystalline matter debased by earths of various kinds in the same species, and then subject to veins, clouds, and other variegations, usually formed by incrustation round a central nucleus, but sometimes the effect of a simple concretion; and veined like the agates, by the disposition which the motion of the

Peat
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Pebbles.

Pebbles. the fluid they were formed in gave their differently coloured substances.

The variety of pebbles is so great, that an hasty describer would be apt to make almost as many species as he saw specimens. A careful examination will teach us, however, to distinguish them into a certain number of essentially different species, to which all the rest may be referred as accidental varieties. When we find the same colours, or those resulting from a mixture of the same, such as nature frequently makes in a number of stones, we shall easily be able to determine that these are all of them the same species, though of different appearances; and that whether the matter be disposed of in one or two, or in 20 crusts, laid regularly round a nucleus; or thrown irregularly, without a nucleus, into irregular lines; or lastly, if blended into an uniform mass.

These are the three states in which every pebble is found; for if it has been naturally and regularly formed by incrustation round a certain nucleus, we find that always the same in the same species, and the crusts not less regular and certain. If the whole has been more hastily formed, and the result only of one simple concretion, if that has happened while its different substances were all moist and thin, they have blended together and made a mixed mass of the joint colour of them all. But if they have been something harder when this has happened, and too far concreted to diffuse wholly among one another, they are found thrown together into irregular veins. These are the natural differences of all the pebbles; and having regard to these in the several variegations, all the known pebbles may be reduced to 34 species.

In all the strata of pebbles there are constantly found some which are broken, and of which the pieces lie very near one another; but as bodies of such hardness could not be broken without some considerable violence, their present situation seems to indicate that they have suffered that great violence in or near the places where they now lie. Beside these, we often meet with others which have as plainly had pieces broken off from them, though those pieces are nowhere to be found; whence it seems equally plain, that whatever has been the cause of their fracture, they have been brought broken, as we find them, from some other place, or else that the pieces broken from them must at some time or other have been carried from this place to some other distant one.

Several of these broken pebbles have their edges and corners so sharp and even, that it seems evident they never can have been tossed about or removed since the fracture was made; and others have their sides and corners so rounded, blunted, and worn away, that they seem to have been roughly moved and rolled about among other hard bodies, either with great violence, or for a very long continuance; since such hard bodies could not have been reduced to the condition in which we now see them without long friction. It may be supposed by some, that these stones never were broken, but have been naturally formed of this shape; but it will be easily seen, by any one who accurately surveys their veins or coats, which surround the nucleus, like the annular circles of a tree, that they must have been originally entire; and this will be the more plain if they are compared with a stone broken by art. Such

pebbles as are found in strata near the surface of the earth, are much more brittle than those which lie in deeper strata; and the more clear and transparent the sand is which is found among pebbles, the more beautiful the pebbles are generally observed to be.

The use of these stones, and their disposition in the earth, is a subject of great wonder; and may serve as one of the numerous proofs of an over-ruling Providence in the disposition of all natural bodies. The surface of the earth is composed of vegetable mould, made up of different earths mixed with the putrid remains of animal and vegetable bodies, and of the proper texture and compages for conducting the moisture to the roots of trees and plants. Under this are laid the sands and pebbles which serve as a sort of drain to carry off the redundant moisture deeper into the earth, where it may be ready to supply the place of what is constantly rising in exhalations; and lest the strata of sand should be too thick, it is common to find thin ones of clay between, which serve to put a stop to the descent of the moisture, and keep it from passing off too soon; and lest these thin strata of clay should yield and give way, and by their softness when wetted give leave to the particles of sand to blend themselves with, and even force their way through them, there are found in many places thin coats of a poor iron ore, placed regularly above and below the clay; and by these means not only strengthening and supporting the clay, but effectually keeping the sand from making its way into it. There are many people of opinion, that the swallowing of pebbles is very beneficial to health, in helping the stomach to digest its food; and a pebble-pellet is an old woman's medicine in the colic in many parts of England. They usually order the small white stones to be picked out of gravel walks for this purpose, and eat them in large quantities in some sort of spoon meat, of which milk is an ingredient.

The thing that has given occasion to this practice seems to have been, that people observe the birds to pick up the gravel, and that they are never well unless they have frequent recourse to this to help their digestion: but this is no similar case at all, for the gizzard or stomach of a bird is made very strong, because the creature hath no teeth to chew its food; and this gizzard is lined with a rough coat, by the help of which and these stones the food they swallow whole is so ground as to yield its juices to the nourishment of the animal. But the stomach of man is formed so very differently, that it can never require those assistances to the comminution of food. Many people have, however, accustomed themselves to swallow not only these small white stones, but large pebbles, even to the size of a walnut each; and these will often pass safely; and people who have long accustomed themselves to swallow them, boast of receiving no injury from them: we can never know, however, that the death of such persons is not owing to them at last; and as they can do no good, it is best always to avoid them. There are, indeed, instances on record in which they have undoubtedly done much mischief.

PECARY, in zoology. See TAJACU.

PECCANT, in medicine, an epithet given to the humours of the body, when they offend either in quantity or quality, *i. e.* when they are either morbid, or in too great abundance. Most diseases arise from peccant humours,

Pebbles
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Peccant.

Pechem humours, which are either to be corrected by alteratives and specifics, or else to be evacuated.

PECHEM, in the materia medica, a name given by the modern Greek writers to the root called *behem* by Avicenna and Serapion. Many have been at a loss to know what this root pechem was; but the virtues ascribed to it are the same with those of the *behem* of the Arabians; its description is the same, and the division of it into white and red is also the same as that of the *behem*. Nay, the word *pechem* is only formed of *behem* by changing the *b* into a *p*, which is very common, and the aspirate into *ch*, or *ch*, which is as common. Myrepsus, who treats of this root, says the same thing that the Arabian Avicenna says of *behem*, namely, that it was the fragments of a woody root, much corrugated and wrinkled on the surface, which was owing to its being so moist whilst fresh, that it always shrunk greatly in the drying.

PECHYAGRA, a name given by authors to the gout affecting the elbow.

PECHYS, a name used by some anatomical writers for the elbow.

PECHYTYRBE, an epithet used by some medical writers for the scurvy.

PECK, a measure of capacity, four of which make a bushel.

PECK (Francis), was born at Stamford in Lincolnshire, May 4th 1692, and educated at Cambridge, where he took the degrees of B. and M. A. He was the author of many works, of which the first is a poem, intitled, "Sighs on the Death of queen Anne;" printed probably about the time of her death in 1714. Two years afterwards he printed "TO TWOΣ'ATION; or an Exercise on the Creation, and an Hymn to the Creator of the World; written in the express words of the sacred text, as an Attempt to show the Beauty and Sublimity of the Holy Scriptures, 1716, 8vo." In 1721, being then curate of King's Clifton in Northamptonshire, he issued proposals for printing the History and Antiquities of his native town, which was published in 1727, in folio, under the title of "*Academia tertia Anglicana; or the Antiquarian Annals of Stamford in Lincoln, Rutland, and Northamptonshires; containing the History of the University, Monasteries, Gilds, Churches, Chapels, Hospitals, and Schools there, &c.*" inscribed to John Duke of Rutland. This work was hastened by "An Essay on the ancient and present State of Stamford, 1726, 4to," written by Francis Hargrave, who, in his preface, mentions the difference which had arisen between him and Mr Peck, on account of the former's publication unfairly forestalling that intended by the latter. Mr Peck is also therein very roughly treated, on account of a small work he had formerly printed, intitled, "The History of the Stamford Bull-running." Mr Peck had before this time obtained the rectory of Godeby near Melton in Leicestershire, the only preferment he ever enjoyed. In 1729, he printed on a single sheet, "Queries concerning the Natural History and Antiquities of Leicestershire and Rutland," which were afterwards reprinted in 1740; but although the progress he had made in the work was very considerable, yet it never made its appearance. In 1732 he published the first volume of "*Desiderata Curiosa; or, a Collection of divers scarce and curious*

Pieces relating chiefly to Matters of English History; consisting of choice tracts, memoirs, letters, wills, epitaphs, &c. transcribed, many of them, from the originals themselves, and the rest from divers ancient MS. copies, or the MS. collations of sundry famous antiquaries and other eminent persons, both of the last and present age: the whole, as nearly as possible, digested into order of time, and illustrated with ample notes, contents, additional discourses, and a complete index." This volume was dedicated to Lord William Manners, and was followed, in 1735, by a second volume, dedicated to Dr Reynolds bishop of Lincoln. In 1735 Mr Peck printed in a 4to pamphlet, "A complete catalogue of all the discourses written both for and against popery in the time of King James II. containing in the whole an account of 457 books and pamphlets, a great number of them not mentioned in the three former catalogues; with references after each title, for the more speedy finding a further account of the said discourses and their authors in sundry writers, and an alphabetical list of the writers on each side." In 1739 he was the editor of "Nineteen Letters of the truly reverend and learned Henry Hammond, D. D. (author of the Annotations on the New Testament, &c.) written to Mr Peter Stainnough and Dr Nathaniel Angelo, many of them on curious subjects, &c." These were printed from the originals, communicated by Mr Robert Marsden archdeacon of Nottingham, and Mr John Worthington. The next year, 1740, produced two volumes in 4to, one of them intitled, "Memoirs of the Life and Actions of Oliver Cromwell, as delivered in three panegyrics of him written in Latin; the first, as said, by Don Juan Roderiguez de Saa Meneses, Conde de Penguiao, the Portugal ambassador; the second, as affirmed by a certain jesuit, the lord ambassador's chaplain; yet both, it is thought, composed by Mr John Milton (Latin secretary to Cromwell), as was the third; with an English version of each. The whole illustrated with a large historical preface; many similar passages from the Paradise Lost, and other works of Mr John Milton, and notes from the best historians. To all which is added, a collection of divers curious historical pieces relating to Cromwell, and a great number of other remarkable persons (after the manner of *Desiderata Curiosa*, v. i. and ii.)" The other, "New Memoirs of the Life and poetical Works of Mr John Milton; with, first, an examination of Milton's style; and secondly, explanatory and critical notes on divers passages in Milton and Shakespeare, by the editor. Thirdly, Baptistes; a sacred dramatic poem in defence of liberty, as written in Latin by Mr George Buchanan, translated into English by Mr John Milton, and first published in 1641, by order of the house of commons. Fourthly, the Parallel, or Archbishop Laud and Cardinal Wolsey compared, a Vision by Milton. Fifthly, the Legend of Sir Nicholas Throckmorton, knt. chief butler of England, who died of poison, anno 1570, an historical poem by his nephew Sir Thomas Throckmorton, knt. Sixth, Herod the Great, by the editor. Seventh, the Resurrection, a poem in imitation of Milton, by a friend. And eighth, a Discourse on the Harmony of the Spheres, by Milton; with prefaces and notes." These were the last publications which

Peck.

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Pecora
Pecten.

he gave the world. When these appeared, he had in contemplation no less than nine different works; but whether he had not met with encouragement for those which he had already produced, or whether he was rendered incapable of executing them by reason of his declining health, is uncertain; but none of them ever were made public. He concluded a laborious, and, it may be affirmed, an useful life, wholly devoted to antiquarian pursuits, Aug. 13th 1743, at the age of 61 years.

PECORA, in zoology, the fifth order of the class mammalia, in the Linnean system. See ZOOLOGY.

PECQUET (John), was a physician in Dieppe, and died at Paris in 1674. He was physician in ordinary to the celebrated Fouquet, whom he entertained at his spare hours with some of the most amusing experiments in natural philosophy. He acquired immortal honour to himself by the discovery of a lacteal vein, which conveys the chyle to the heart; and which from his name is called *le Reservoir de Pecquet*. This discovery was a fresh proof of the truth of the circulation of the blood: though it met with opposition from many of the learned, particularly from the famous Riola, who wrote a treatise against the author of it, with this title: *Adversus Pecquetum & Pecquetianos*. The only works which we have of Pecquet, are, 1. *Experimenta nova Anatomica*, published at Paris, 1654. 2. A Dissertation, *De Thoracis Lacteis*, published at Amsterdam, 1661. He was a man of a lively and active genius; but his sprightliness sometimes led him to adopt dangerous opinions. He recommended, as a remedy for all diseases, the use of brandy. This remedy, however, proved fatal to himself, and contributed to shorten his days, which he might have employed to the advantage of the public.

PECTEN, the SCALLOP; a genus of shell-fish, the characters of which are these: The animal is a tethys; the shell bivalve and unequal; the hinge toothless, having a small ovated hollow. This shell-fish is one of the spinners, having the power of spinning threads like the muscles: but they are much shorter and coarser than even those of that fish; so that they can never be wrought into any kind of work like the longer and finer threads of the pinna marina. The use of the threads which are spun by the scallop is to fix the creature to any solid body near its shell. All these proceed, as in the muscle, from one common trunk. It is an evident proof that the fish has a power of fixing itself at pleasure to any solid body by means of these threads, that after storms the scallops are often found tossed upon rocks, where there were none the day before; and yet these are fixed by their threads, as well as those which had remained ever so long in their place. They form their threads in the very same manner which the muscle; only their organ which serves for spinning is shorter, and has a wider hollow, whence the threads are necessarily thicker and shorter.

Mr Barbut divides the genus ostrea into four families; which he thus names according to their characters. 1. The winged equilateral pectens. 2. The pectens, that have one ear inwardly, spring by being ciliated. 3. The pectens that have their valves more gibbous on one side than on the other. 4. The rough ones, commonly called oysters. Of the locomotive powers

of the pecten, we have already treated under the article *Animal Motion*, which see p. 411. col. 2.

The pectens, such as the sole-pecten, the ducal mantle pecten, the knotted, and others, seem to be in general inhabitants of the Indian seas; some of them frequent those of Africa and the South Seas. The most remarkable species is the *maximus* or great scallop, being the same with what Barbut calls the *ducal-mantle pecten*. It has 14 rays, very prominent and broad, and striated both above and below. They are rugged and imbricated with scales. They grow to a large size; are found in beds by themselves; are dredged up, and barrelled for sale. The ancients say that they have a power of removing themselves from place to place by vast springs or leaps. This shell was used both by the Greeks and Latins as a food. When dressed with pepper and cummin, it was taken medicinally. The scallop was commonly worn by pilgrims on their hat, or the cape of their coat, as a mark that they had crossed the sea in their way to the Holy Land, or some distant object of devotion.

The name *pecten* seems to have been given to these animals, from the longitudinal striæ with which their surface is covered, which resemble somewhat the teeth of a comb; and hence also the Greek name *κτεν*. By the general character of this shell, it evidently includes cockles as well as scallops, which are the pectens without ears, and having less flat or elated shells. They are called by all authors by a name which is only a diminutive of *pecten*, *pectunculus*. The having ears indeed is the common mark of distinction between the pectens and the cockles, which last usually have none; yet the genera are not distinct, as some have imagined: for there are shells universally allowed to be pectens or scallops, which have no ears, and others as universally allowed to be pectuncles or cockles which have. Hence then appears the error of Lister, who made them two distinct genera, and gave the ears and the equal convexity of both shells as the great characteristics of them: which, though they be good marks to distinguish the species by, are far from being so unalterable as to found different genera upon.

Barbut, we have seen, ranks the pectens under the genus ostrea; but he says, that though the generic character of the hinge agrees in both, the animal inhabiting the pectens is very different from that of the oyster; for which reason Linnæus has divided the genus into sections. The pectines by some are esteemed as delicious a food as the oyster. They differ very materially in a variety of circumstances. The pectens, as we have already observed, sail on the surface of the water; and besides, if they are attacked by a foe, they let down the membrane which nature has provided them for a sail, and drop to the bottom. "Behold (says Barbut) the splendor of the pectines, which rival the glowing colours of the papilionaceous tribe, as numerous as they are beautiful, flitting from place to place, and may well be called the papiliones of the ocean. What superior qualities does not the pectines enjoy above the ostrea edulis, which, constantly confined to its native bed, seems wholly destined to afford food to other creatures, not having any means of defence, but its shelly castle, which is frequently attacked and stormed by its numerous enemies? This creature is not only useful to man as a dainty food, but the shell being le-

Pecten.

Pecten. vigated into a subtle powder, is employed as an absorbent in heart-burns and other like complaints arising from acidities in the first passages; the hollow shells are generally made choice of, as containing more than the thinner flat ones, of the fine white earth, in proportion to the outer rough coat, which last is found to be considerably impregnated with sea-salt."

The grand mark of distinction between the *pectens* and oyster seems to be the locomotive faculty. It was long supposed, that the oyster possessed no power of motion, that it always remained in the place in which nature or accident had placed it, and that its life differed little from that of vegetables. Experience, however, has taught us to reject these premature conclusions. We shall here lay before our readers at length, though perhaps a little out of its place, what Abbé Dicquemare has observed with respect to this circumstance, the conclusions of whose remarks we have given in another place. See *Animal Motion*, p. 411. col. 2.

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"Passing one day (says the Abbé) along the sea-shore, I observed an oyster lying in a shallow place, and ejecting with considerable force a quantity of water. It immediately occurred to me, that, if this happened at a sufficient depth, the resistance of the water would have forced the oyster from its place. To be satisfied of this, I took several middle-sized oysters with a light shell, and placed them on a smooth horizontal surface, in a sufficient quantity of pure sea-water. Some hours elapsed, and the night came on before any thing remarkable appeared; but next day I found one of the oysters in a place and situation different from that in which I had left it; and as nothing could have discomposed it, I could not doubt but that it had moved by its own powers. I continued, however, to attend my charge; but, as if they meant to conceal their secret, the oysters always operated in my absence. At last, as I was exploring the coast of Lower Normandy, I perceived in an oyster-bed one of them changing place pretty quickly. On my return, therefore, to Havre, I made new dispositions to discover the means by which the motions of oysters are performed, and I succeeded. This animal ejects the water by that part of the shell which is diametrically opposite to the hinge; it can also throw it out at the sides, at each extremity of the hinge, or even from the whole opening at once. For this purpose, it can vary the action of its internal mechanism; but the soft parts are not the only organs that perform this function; in certain cases the shells assist in forcing out the water.

"When an oyster thus suddenly, forcibly, and repeatedly, squirts forth a quantity of water, it repulses those of its enemies that endeavour to insinuate themselves within the shells while they are open: but this is effectual only against its weakest foes; for there are some so formidable by their strength or their address, that a great number of oysters perish in this way. The animal, therefore, endeavours with all its force to repel them; it does more, it retreats backwards, or starts aside in a lateral direction. All of them, however, are not placed in circumstances favourable for these motions. They are often situated in the crevices of rocks, between stones, or among other oysters, some in sand, and some in mud; so that their strength, or powers of

Pecten. motion, are exerted in vain. It is probable, however, that they have the faculty of operating their own relief from these circumstances, and that they may be accidentally assisted by other bodies. It must, however, be acknowledged, that the means of relief cannot be numerous or considerable in such as are attached to other oysters, to a body heavier than themselves, or to a rock; but such situations are the most uncommon in the oyster-beds that I am acquainted with on the French coasts in the Channel. Perhaps, indeed, a very angular or heavy shell may be sufficient to render an oyster immovable. This is undoubtedly the case with such of them as have been obliged by worms, or other more formidable enemies, so to increase their shells as to make them thick and unwieldy. But we do not know whether these animals, in unfavourable circumstances, may not be able to supply those manoeuvres that I have mentioned by others that I have not as yet been able to observe. An oyster that has never been attached, may fix itself by any part of the margin of either of its valves, and that margin will become the middle, or nearly so, if the oyster is young. I would not be surprised that oysters, which have been fixed to a rock from the beginning, should be able to detach themselves. I have seen them operate upon their shells in so many different ways, and with such admirable contrivance, when those shells have been pierced by their enemies (among whom I must be ranked), that I do not think it at all impossible for them to quit the place to which they are attached. It will easily be imagined how delicate and difficult such observations and experiments must be, considering the sensibility of the animal, the delicacy of its organs, the transparency of the matter that forms the layers of its shells, the opacity of the shells themselves, the vicissitudes of the sea, and the seasons, &c. But it was of use to show, that, contrary to the opinion generally entertained by the learned as well as by fishermen, oysters are endowed with a locomotive faculty, and by what means that faculty is exerted. I must add, that those which first showed me these motions, were brought from the coasts of Bretagne, put into a bed at La Hogue, then at Courseulles, whence they were carried to Havre; and that, as all these transportations were made in a dry carriage, the oysters could not be in perfect vigour. It was necessary also to show, that these animals have much more sensation and more industry than is generally attributed to them.

"It is not often that a sagacious observer of nature is seduced from his object by the pride of appearing above it, or the desire of generalization. To think of grasping the whole of nature, when we are unable to consider in the whole the first and most interesting of her kingdoms, is a vain illusion. Yet some have endeavoured to confound the kingdoms, while they have taken the liberty of dividing the highest of them into beings differently animalized. Under the pretence of having a better idea of it, they lopped off all the extremities; that is to say, they rid themselves of every thing they were not well acquainted with, or that threw difficulties in their way. This, to be sure, was very convenient, but very unsuitable to the proceeding of an enlarged mind, and very unfit to inform us with regard to the œconomy of nature. The organization of the oyster, though very different from that

Pectoral
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Peculiar.

with which we are best acquainted, may be comprehended under our considerations of the animal economy in general. Those authors are not so enlightened as they imagine, who represent the oyster as an animal deprived of sensation, as an intermediate being between animals and vegetables, as a plant, and even in some respects as inferior to a plant. It is thus that the oyster has been made a foundation for many an absurd hypothesis with respect to the nature of animals. But let us quit the consideration of these faithless pictures, and attend to the original.

"The oyster is conscious of its existence, and conscious also that something exists exterior to itself. It chooses, it rejects; it varies its operations with judgment, according to circumstances; it defends itself by means adequate and complicated; it repairs its losses; and it can be made to change its habits. Oysters newly taken from places which the sea had never left, inconsiderately open their shells, lose the water they contain, and die in a few days: but those that have been taken from the same place, and thrown into beds or reservoirs from which the sea occasionally retires, where they are incommoded by the rays of the sun, or by the cold, or where they are exposed to the injuries of man, learn to keep themselves close when they are abandoned by the water, and live a much longer time." See OSTREA.

PECTORAL, a sacerdotal habit or vestment, worn by the Jewish high-priest. The Jews called it *Hoshchen*, the Greeks *λογιον*, the Latins *rationale* and *pectorale*, and in our version of the Bible it is called *breastplate*. It consisted of embroidered stuff, about a span square, and was worn upon the breast, set with twelve precious stones, ranged in four rows, and containing the names of the twelve tribes. It was fastened to the shoulder by two chains and hooks of gold. God himself prescribed the form of it. See BREASTPLATE.

PECTORALE, a breastplate of thin brass, about 12 fingers square, worn by the poorer soldiers in the Roman army, who were rated under 1000 drachmæ. See LORICA.

PECTORAL, an epithet for medicines good in diseases of the breast and lungs.

PECTORALIS, in ANATOMY. See there, *Table of the Muscles*.

PECULATE, in civil law, the crime of embezzling the public money, by a person intrusted with the receipt, management, or custody thereof. This term is also used by civilians for a theft, whether the thing be public, fiscal, sacred, or religious.

PECULIAR, in the canon law, signifies a particular parish or church that has jurisdiction within itself for granting probates of wills and administrations, exempt from the ordinary or bishop's courts. The king's chapel is a royal peculiar, exempt from all spiritual jurisdiction, and reserved to the visitation and immediate government of the king himself. There is likewise the archbishop's peculiar: for it is an ancient privilege of the see of Canterbury, that wherever any manors or advowsons belong to it, they forthwith become exempt from the ordinary, and are reputed peculiars: there are 57 such peculiars in the see of Canterbury.

Besides these, there are some peculiars belonging to deans, chapters, and prebendaries, which are only exempted from the jurisdiction of the archdeacon: these

are derived from the bishop, who may visit them, and Peculium to whom there lies an appeal.

Court of PECULIARS, is a branch of, and annexed to, the court of ARCHES. It has a jurisdiction over all those parishes dispersed through the province of Canterbury in the midst of other dioceses, which are exempt from the ordinary's jurisdiction, and subject to the metropolitan only. All ecclesiastical causes, arising within these peculiar or exempt jurisdictions, are originally cognizable by this court: from which an appeal lay formerly to the pope, but now by the stat. 25 H. VIII. c. 19. to the king in chancery.

PECULIUM, the stock or estate which a person, in the power of another, whether male or female, either as his or her slave, may acquire by his industry. Roman slaves frequently amassed considerable sums in this way. The word properly signifies the advanced price which a slave could get for his master's cattle, &c. above the price fixed upon them by his master, which was the slave's own property.

In the Romish church, peculium denotes the goods which each religious reserves and possesses to himself.

PEDALS, the largest pipes of an organ, so called because played and stopped with the foot. The pedals are made square, and of wood; they are usually 13 in number. They are of modern invention, and serve to carry the sounds of an octave deeper than the rest. See ORGAN.

PEDAGOGUE, or PÆDAGOGUE, a tutor or master, to whom is committed the discipline and direction of a scholar, to be instructed in grammar and other arts. The word is formed from the Greek *παιδων αγωγος*, *puerorum duator*, "leader of boys."

M. Fleury observes, that the Greeks gave the name *pædagogus* to slaves appointed to attend their children, lead them, and teach them to walk, &c. The Romans gave the same denomination to the slaves who were intrusted with the care and instruction of their children.

PEDANT, a schoolmaster or pedagogue, who professes to instruct and govern youth, teach them the humanities, and the arts. See PEDAGOGUE.

PEDANT is also used for a rough, unpolished man of letters, who makes an impertinent use of the sciences, and abounds in unseasonable criticisms and observations.

Dacier defines a pedant, a person who has more reading than good sense. See PEDANTRY.

Pedants are people ever armed with quibbles and syllogisms, breathe nothing but disputation and chicanery, and pursue a proposition to the last limits of logic.

Malebranche describes a pedant as a man full of false erudition, who makes a parade of his knowledge, and is ever quoting some Greek or Latin author, or hunting back to a remote etymology.

St Evremont says, that to paint the folly of a pedant, we must represent him as turning all conversation to some one science or subject he is best acquainted withal.

There are pedants of all conditions, and all robes. Wicquefort says, an ambassador, always attentive to formalities and decorums, is nothing else but a political pedant.

PEDANTRY, or PEDANTISM, the quality or manner of a pedant. See PEDANT.

Pedarian

Pedarian.
Pedarian.

To swell up little and low things, to make a vain show of science, to heap up Greek and Latin, without judgment, to tear those to pieces who differ from us about a passage in Suetonius or other ancient authors, or in the etymology of a word, to stir up all the world against a man for not admiring Cicero enough, to be interested for the reputation of an ancient as if he were our next of kin, is what we properly call *pedantry*.

PEDARIAN, in Roman antiquity, those senators who signified their votes by their feet, not with their tongues; that is, such as walked over to the side of those whose opinion they approved of, in divisions of the senate.

Dr Middleton thus accounts for the origin of the word. He says, that though the magistrates of Rome had a right to a place and vote in the senate both during their office and after it, and before they were put upon the roll by the censors, yet they had not probably a right to speak or debate there on any question, at least in the earlier ages of the republic. For this seems to have been the original distinction between them and the ancient senators, as it is plainly intimated in the formule of the consular edict, sent abroad to summon the senate, which was addressed to all senators, and to all those who had a right to vote in the senate. From this distinction, those who had only a right to vote were called in ridicule *pedarian*; because they signified their votes by their feet, not their tongues, and upon every division of the senate went over to the side of those whose opinion they approved. It was in allusion to this old custom, which seems to have been wholly dropt in the latter ages of the republic, that the mute part of the senate continued still to be called by the name of *pedarians*, as Cicero informs us, who in giving an account to Atticus of a certain debate and decree of the senate upon it, says that it was made with the eager and general concurrence of the *pedarians*, though against the authority of all the consulars.

PEDATURA, a term used, in Roman antiquity, for a space or proportion of a certain number of feet set out. This word often occurs in writers on military affairs: as in Hyginus de Castrametatione we meet with *meminerimus itaque ad computationem cohortis equitatus miliarie pedaturam ad milletrecentos sexaginta dari debere*; which is thus explained: The *pedatura*, or space allowed for a *cohort equitata* or provincial cohort, consisting of both horse and foot, could not be the same as the *pedatura* of an uniform body of infantry, of the same number, but must exceed it by 360 feet; for the proportion of the room of one horseman to one foot soldier he assigns as two and a half to one.

PEDERASTS, the same with SODOMITES.

PEDESTAL, in architecture, the lowest part of an order of columns, being that part which sustains the column, and serves it as a foot or stand. See COLUMN.

PEDIÆAN, in Grecian antiquity. The city of Athens was anciently divided into three different parts; one on the descent of an hill; another on the sea-shore; and a third in a plain between the other two. The inhabitants of the middle region were called Πεδιαιοι, *Pediæans*, formed from πῶδιον, "plain," or "flat;" or as Aristotle will have it, *Pediaci*: those

of the hill, *Diacrians*; and those of the shore, *Paralians*.

These quarters usually composed so many different factions. Pisistratus made use of the *Pediæans* against the *Diacrians*. In the time of Solon, when a form of government was to be chosen, the *Diacrians* chose it democratic; the *Pediæans* demanded an aristocracy; and the *Paralians* a mixed government.

PEDICLE, among botanists, that part of a stalk which immediately sustains the leaf of a flower or a fruit, and is commonly called a *footstalk*.

PEDICULUS, the LOUSE, in zoology, a genus of insects belonging to the order of aptera. It has six feet, two eyes, and a sort of sting in the mouth; the feelers are as long as the thorax; and the belly is depressed and sublobated. It is an oviparous animal. They are not peculiar to man alone, but infest other animals, as quadrupeds and birds, and even fishes and vegetables; but these are of peculiar species on each animal, according to the particular nature of each, some of which are different from those which infest the human body. Nay, even insects are infested with vermin which feed on and torment them. Several kinds of beetles are subject to lice; but particularly that kind called by way of eminence the *lousy beetle*. The lice on this are very numerous, and will not be shook off. The earwig is often infested with lice, just at the setting on of its head: these are white, and shining like mites, but they are much smaller; they are round-backed, flat-bellied, and have long legs, particularly the foremost pair. Snails of all kinds, but especially the large naked sorts, are very subject to lice; which are continually seen running about them, and devouring them. Numbers of little red lice, with a very small head, and in shape resembling a tortoise, are often seen about the legs of spiders, and they never leave the animal while he lives; but if he is killed, they almost instantly forsake him. A sort of whitish lice is found on humble-bees; they are also found upon ants; and fishes are not less subject to them than other animals.

Kircher tells us, that he found lice also on flies, and M. de la Hire has given a curious account of the creature which he found on the common fly. Having occasion to view a living fly with the microscope, he observed on its head, back, and shoulders, a great number of small animals crawling very nimbly about, and often climbing up the hairs which grow at the origin of the fly's legs. He with a fine needle took up one of these, and placed it before the microscope used to view the animalcules in fluids. It had eight legs; four on each side. These were not placed very distant from each other; but the four towards the head were separated by a small space from the four towards the tail. The feet were of a particular structure, being composed of several fingers, as it were, and fitted for taking fast hold of any thing; but the two nearest the head were also more remarkable in this particular than those near the tail; the extremities of the legs for a little way above the feet were dry and void of flesh like the legs of birds, but above this part they appeared plump and fleshy. It had two small horns upon its head, formed of several hairs arranged closely together; and there were some other clusters of hairs by the side of these

L. 2

horns,

Pedicle,
Pediculus.

Pediculus. horns, but they had not the same figure; and towards the origin of the hinder legs there were two other such clusters of hairs which took their origin at the middle of the back. The whole creature was of a bright yellowish red; the legs, and all the body, except a large spot in the centre, were perfectly transparent. In size, he computed it to be about $\frac{1}{1000}$ th part of the head of the fly; and he observes, that such kind of vermin are rarely found on flies.

The louse which infests the human body makes a very curious appearance through a microscope. It has such a transparent shell or skin, that we are able to discover more of what passes within its body than in most other living creatures. It has naturally three divisions, the head, the breast, and the tail part. In the head appear two fine black eyes, with a horn that has five joints, and is surrounded with hairs standing before each eye; and from the end of the nose or snout there is a pointed projecting part, which serves as a sheath or case to a piercer or sucker, which the creature thrusts into the skin to draw out the blood and humours which are its destined food; for it has no mouth that opens in the common way. This piercer or sucker is judged to be 700 times smaller than a hair, and is contained in another case within the first, and can be drawn in or thrust out at pleasure. The breast is very beautifully marked in the middle; the skin is transparent, and full of little pits; and from the under part of it proceed six legs, each having five joints, and their skin all the way resembling shagreen, except at the ends where it is smoother. Each leg is terminated by two claws, which are hooked, and are of an unequal length and size. These it uses as we would a thumb and middle finger; and there are hairs between these claws as well as all over the legs. On the back part of the tail there may be discovered some ring-like divisions, and a sort of marks which look like the strokes of a rod on the human skin; the belly looks like shagreen, and towards the lower end it is very clear, and full of pits: at the extremity of the tail there are two semicircular parts all covered over with hairs, which serve to conceal the anus. When the louse moves its legs, the motion of the muscles, which all unite in an oblong dark spot in the middle of the breast, may be distinguished perfectly, and so may the motion of the muscles of the head when it moves its horns. We may likewise see the various ramifications of the veins and arteries, which are white, with the pulse regularly beating in the arteries. But the most surprising of all the sights is the peristaltic motion of the guts, which is continued all the way from the stomach down to the anus.

If one of these creatures, when hungry, be placed on the back of the hand, it will thrust its sucker into the skin, and the blood which it sucks may be seen passing in a fine stream to the fore-part of the head; where, falling into a roundish cavity, it passes again in a fine stream to another circular receptacle in the middle of the head; from thence it runs through a small vessel to the breast, and then to a gut which reaches to the hinder part of the body, where in a curve it turns again a little upward; in the breast and gut the blood is moved without intermission, with a great force; especially in the gut, where it occasions such a contraction of the gut as is very surprising. In the

upper part of the crooked ascending gut above-men-tioned, the propelled blood stands still, and seems to undergo a separation, some of it becoming clear and waterish, while other black particles are pushed forward to the anus. If a louse is placed on its back, two bloody darkish spots appear; the larger in the middle of the body, the lesser towards the tail; the motions of which are followed by the pulsation of the dark bloody spot, in or over which the white bladder seems to lie. This motion of the systole and diastole is best seen when the creature begins to grow weak; and on pricking the white bladder, which seems to be the heart, the creature instantly dies. The lower dark spot is supposed to be the excrement in the gut.

Lice have been supposed to be hermaphrodites: but this is erroneous; for Mr Lieuwenhoeck observed, that the males have stings in their tails, which the females have not. And he supposes the smarting pain which those creatures sometimes give, to be owing to their stinging with these stings when made uneasy by pressure or otherwise. He says, that he felt little or no pain from their suckers, though six of them were feeding on his hand at once.

In order to know the true history and manner of breeding of these creatures, Mr Lieuwenhoeck put two female lice into a black stocking, which he wore night and day. He found, on examination, that in six days one of them had laid above 50 eggs; and, upon dissecting it, he found as many yet remaining in the ovary: whence he concludes, that in 12 days it would have laid 100 eggs. These eggs naturally hatch in six days, and would then probably have produced 50 males, and as many females; and these females coming to their full growth in 18 days, might each of them be supposed after 12 days more to lay 100 eggs; which eggs, in six days more, might produce a young brood of 5000: so that in eight weeks, one louse may see 5000 of its own descendants.

Signior Rhedi, who has more attentively observed these animals than any other author, has given several engravings of the different species of lice found on different animals. Men, he observes, are subject to two kinds; the common louse and the crab-louse. He observes also, that the size of the lice is not at all proportioned to that of the animal which they infest; since the starling has them as large as the swan.

Some kinds of constitutions are more apt to breed lice than others: and in some places of different degrees of heat, they are certain to be destroyed upon people who in other climates are over-run with them. It is an observation of Oviedo, that the Spanish sailors, who are generally much afflicted with lice, always lose them in a certain degree of latitude in their voyages to the East Indies, and have them again on their returning to the same degree. This is not only true of the Spaniards, but of all other people who make the same voyage; for though they set out ever so lousy, they have not one of those creatures by the time they come to the tropic. And in the Indies there is no such thing as a louse about the body, though the people be ever so nasty. The sailors continue free from these creatures till their return; but in going back, they usually begin to be lousy after they arrive at the latitude of the Madeira islands. The extreme sweats, which the working people naturally fall into between

Pediculus. between the latitude of Madeira and the Indies, drown and destroy the lice; and have the same effect as the rubbing over the lousy heads of children with butter and oil. The sweat, in these hot climates, is not rank as in Europe, and therefore it is not apt to breed lice; but when people return into latitudes where they sweat rank again, their nastiness subjects them to the same visitations of these vermin as before. The people in general in the Indies are very subject to lice in their heads, tho' free from them on their bodies. The reason of this is, that their heads sweat less than their bodies, and they take no care to comb and clean them. The Spanish negroes wash their heads thoroughly once every week with soap, to prevent their being lousy. This makes them escape much better than the other negroes, who are slaves there; for the lice grow so numerous in their heads, that they often eat large holes in them.

Cleanliness is doubtless the grand secret by which to keep clear from lice, especially when we wear woollen clothes. It is also necessary where there is any danger, to take nourishing, succulent food, and to use wholesome drink. J. Mercurial advises frequent purges as a cure in the pedicular disease: it is necessary also to rub with garlic and mustard, to take treacle inwardly, also salted and acid food, to bathe, and to foment the body with a decoction of lupines, or of gall-nuts; but the most effectual remedies are sulphur and tobacco, mercurial ointment, black pepper, and vinegar. Monkeys and some Hottentots, we are told, eat lice; and are thence denominated *phthiophages*. On the coast of the Red Sea it is reported, that there is a nation of small stature and of a black colour, who use locusts for the greatest part of their food, prepared only with salt. On such food those men live till 40, and then die of a pedicular or lousy disease. A kind of winged lice devour them, their body putrefies, and they die in great torment. It is also a fact that the negroes on the west coast of Africa take great delight in making their women clear their bodies of lice, and those latter devour them with greediness as fast as they find them.

In ancient medicine lice were esteemed aperient febrifuge, and proper for curing a pale complexion. The natural repugnance to those ugly creatures (says Lemery) perhaps contributed more to banish the fever than the remedy itself. In the jaundice five or six were swallowed in a soft egg. In the suppression of urine, which happens frequently to children at their birth, a living louse is introduced into the urethra, which, by the tickling which it occasions in the canal, forces the sphincter to relax, and permits the urine to flow. A bug produces the same effect. Farriers have also a custom (says M. Bourgeois) of introducing one or two lice into the urethra of horses when they are seized with a retention of urine, a disease pretty common among them. But, according to the Continuation of the *Materia Medica*, to use the pedicular medicine with the greatest advantage, one would need to be in Africa, where those insects are carefully sought after and swallowed as a delicious morsel. The great distinction between those which infest mankind is into the head and body louse. The former is hard and high coloured, and the latter less compact and more of an ashen colour. If it were

possible to give a reason why some families of the same species stick to the head and others to the clothes, &c. it would also in all probability be possible to understand the nature of many contagious diseases.

PEDILUVIUM, or *BATHING of the FEET*. The uses of warm bathing in general, and of the pediluvium in particular, are so little understood, that they are often preposterously used, and sometimes as injudiciously abstained from.

In the Edinburgh Medical Essays, we find an ingenious author's opinion of the warm pediluvium, notwithstanding that of Borelli, Boerhaave, and Hoffman, to the contrary, to be, That the legs becoming warmer than before, the blood in them is warmed: this blood rarifying, distends the vessels; and in circulating imparts a great degree of warmth to the rest of the mass; and as there is a portion of it constantly passing through the legs, and acquiring new heat there, which heat is in the course of circulation communicated to the rest of the blood, the whole mass rarifying, occupies a larger space, and of consequence circulates with greater force. The volume of the blood being thus increased, every vessel is distended, and every part of the body feels the effects of it; the distant parts a little later than those first heated. The benefit obtained by a warm pediluvium is generally attributed to its making a derivation into the parts immersed, and a revulsion from those affected, because they are relieved; but the cure is performed by the direct contrary method of operating, viz. by a greater force of circulation through the parts affected, removing what was stagnant or moving too sluggishly there. Warm bathing is of no service where there is an irresoluble obstruction, though, by its taking off from a spasm in general, it may seem to give a moment's ease; nor does it draw from the distant parts, but often hurts by pushing against matter that will not yield with a stronger impetus of circulation than the stretched and diseased vessels can bear: so that where there is any suspicion of scirrhus, warm bathing of any sort should never be used. On the other hand, where obstructions are not of long standing, and the impacted matter is not obstinate, warm baths may be of great use to resolve them quickly. In recent colds, with slight humoral peripneumonies, they are frequently an immediate cure. This they effect by increasing the force of the circulation, opening the skin, and driving freely through the lungs that lentor which stagnated or moved slowly in them. As thus conducing to the resolution of obstructions, they may be considered as short and safe fevers; and in using them we imitate nature, which by a fever often carries off an obstructing cause of a chronical ailment. Borelli, Boerhaave, and Hoffman, are all of opinion, that the warm pediluvium acts by driving a larger quantity of blood into the parts immersed. But arguments must give way to facts: the experiments related in the Medical Essays seem to prove to a demonstration, that the warm pediluvium acts by rarifying the blood.

A warm pediluvium, when rightly tempered, may be used as a safe cordial, by which circulation can be roused, or a gentle fever raised; with this advantage over the cordials and sudorifics, that the effect of them may be taken off at pleasure.

Pediluvium.

Pediment

Pedro.

Pediluvia are sometimes used in the small-pox ; but Dr Stevenson thinks their frequent tumultuous operations render that suspected, and at best of very doubtful effect ; and he therefore prefers Mons. Martin of Lausanne's method of bathing the skin, not only of the legs, but of the whole body, with a soft cloth dipped in warm water, every four hours, till the eruption ; by which means the pustules may become universally higher, and consequently more safe.

PEDIMENT. See ARCHITECTURE, p. 240, &c.

PEDLAR, a travelling foot-trader. See HAWKERS.

In Britain (and formerly in France) the pedlars are despised ; but it is otherwise in certain countries. In Spanish America, the business is so profitable, that it is thought by no means dishonourable ; and there are many gentlemen in Old Spain, who, when their circumstances are declining, send their sons to the Indies to retrieve their fortunes in this way. Almost all the commodities of Europe are distributed through the southern continent of America by means of these pedlars. They come from Panama to Païta by sea ; and in the road from the port last mentioned, they make Peura their first voyage to Lima. Some take the road through Caxamalia ; others through Truxillo, along shore from Lima. They take their passage back to Panama by sea, and perhaps take with them a little cargo of brandy. At Panama they again stock themselves with European goods, returning by sea to Païta, where they are put on shore ; there they hire mules and load them, the Indians going with them in order to lead them back. Their travelling expences are next to nothing ; for the Indians are brought under such subjection, that they find lodging for them, and provender for their mules, frequently thinking it an honour done them for their guests to accept of this for nothing, unless the stranger now and then, out of generosity or compassion, makes a small recompence.

In Poland, where there are few or no manufactures, almost all the merchandize is carried on by pedlars, who are said to be generally Scotsmen, and who, in the reign of king Charles II. are said to have amounted to no fewer than 53,000.

PEDOMETER, or PODOMETER, formed from *πῶς*, *pes*, "foot," and *μέτρον*, "measure," way-wiser ; a mechanical instrument, in form of a watch, consisting of various wheels with teeth, catching in one another, all disposed in the same plane ; which, by means of a chain or string fastened to a man's foot, or to the wheel of a chariot, advance a notch each step, or each revolution of the wheel ; so that the number being marked on the edge of each wheel, one may number the paces, or measure exactly the distance from one place to another. There are some of them which mark the time on a dial-plate, and are in every respect much like a watch, and are accordingly worn in the pocket like a watch.

PEDRO (Don) of Portugal, duke of Coimbra, was the fourth child and second surviving son of King John of Portugal, and was born March the 4th 1394. His father gave him an excellent education, which, joined to strong natural abilities and much application, rendered him one of the most accomplished princes of his time. He was not only very learned himself, but a great lover of learning, and a great patron

of learned men. It was chiefly with a view to improve his knowledge that he spent four years in travelling through different countries in Europe, Asia, and Africa, with a train suitable to his quality ; of which travels there is a relation still extant, but so loaded with fabulous circumstances, that it wounds the reputation it was designed to raise. At his return he espoused Isabella, daughter to the count of Urgel, and grand-daughter to Don Pedro, the fourth king of Portugal, which was esteemed a very great advancement of his fortune. He was elected into the most noble order of the Garter, April 22. 1417, in the fifth year of the reign of his cousin Henry V. grandson of John of Gaunt, by the father's side, as our duke of Coimbra was by the mother. In 1440 he was declared regent during the minority of his cousin Don Alonso V. son of king Edward, who died by the plague. He found some difficulty at first in the discharge of his office, both from the queen-mother and others. But upon the whole, his administration was so mild and so just, that the magistrates and people of Lisbon concurred in demanding his leave to erect a statue to him. The regent thanked them, said he should be unwilling to see a work of their's demolished ; and that he was sufficiently rewarded by this public testimony of their affections. The queen dowager wished to raise disturbances in Portugal by aiming to recover the regency to herself ; but the steadiness of the regent's administration, the attachment of the best part of the nobility to him, and his enjoying, in so absolute a degree, the confidence of the people ; not only secured the interior tranquillity of the state, but raised the credit likewise of the crown of Portugal to a very great height in the sentiments of its neighbours : for in the course of his regency he had made it his continual study to pursue the public good ; to ease the people in general, and the inhabitants of Lisbon in particular, of several impositions ; to maintain the laws in their full vigour ; to give the king an excellent education ; and if that had been at all practicable, to diffuse a perfect unanimity through the court, by assuaging the malice and envy of his enemies. The king when he came of age, and the cortes or parliament, expressed their entire satisfaction with the regent's administration ; and all parties entirely approved of the king's marriage with Donna Isabella, the regent's daughter, which was celebrated in 1446. The enmity of his enemies, however, was not in the least abated by the regent's being out of office. They still persecuted him with their unjust calumnies, and unfortunately made the king hearken to their falsehoods. The unfortunate duke, when ordered to appear before the king, was advised to take with him an escort of horse and foot. In his passage he was proclaimed a rebel, and quickly after he was surrounded by the king's troops. Soon after he was attacked, and in the heat of action he was killed : nor was the envy of his enemies even then satiated ; his body was forbid burial ; and was at length taken away privately by the peasants. His virtue, however hated in courts, was adored by the uncorrupt part of his countrymen. At length, tho', by an inspection of his papers, the king saw, when it was too late, the injustice that had been done the man who had behaved so well in so high and difficult an office ; and whose papers only discovered signs of further benefit

Pedro.

Peduncle,
Peebles.

Peek
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Peer.

to the king and his dominions. In consequence of these discoveries, the duke's adherents were declared loyal subjects, all prosecutions were ordered to cease, and the king desired the body of Coimbra to be transported with great pomp from the castle of Abrantes to the monastery of Batalha; where it was interred in the tomb which he had caused to be erected for himself. The royal name of Don Pedro occurs often in the history of Portugal, and many who bore the name were singularly distinguished either for internal abilities, or external splendor. See PORTUGAL.

PEDUNCLE, in botany. See PEDICLE.

PEEBLES, or TWEEDALE, a county of Scotland, extending 25 miles in length and 18 in breadth. It is bounded on the east by Ettrick Forest, on the south by Annandale, on the west by Clydesdale, and on the north by Mid Lothian. Tweeddale is a hilly country, well watered with the Tweed, the Yarrow, and a great number of smaller streams that fertilize the valleys, which produce good harvests of oats and barley, with some proportion of wheat. All the rivers of any consequence abound with trout and salmon. The lake called *West Water Loch* swarms with a prodigious number of eels. In the month of August, when the west wind blows, they tumble into the river Yarrow in such shoals, that the people who wade in to catch them run the risk of being overturned. There is another lake on the borders of Annandale, called *Loch-gennen*, which forms a cataract over a precipice 250 paces high: here the water falls with such a momentum as to kill the fish underneath. About the middle of this country is the hill or mountain of Braidalb, from the top of which the sea may be seen on each side of the island. Tweeddale abounds with limestone and freestone. The hills are generally as green as the downs in Sussex, and feed innumerable flocks of sheep, that yield great quantities of excellent wool. The country is well shaded with woods and plantations, abounds with all the necessaries of life, and is adorned with many fine seats and populous villages. The earls of March were hereditary sheriffs of Tweeddale, which bestows the title of *marquis* on a branch of the ancient house of Hay, earls of Errol, and hereditary high constables of Scotland. The family of Tweeddale is, by the female side, descended from the famous Simon de Frazer, proprietor of great part of this country, who had a great share in obtaining the triple victory at Roslin. The chief, and indeed the only town of consequence in Tweeddale, is PEEBLES, a small inconsiderable royal borough, and seat of a presbytery, pleasantly situated on the banks of the Tweed, over which there is at this place a stately stone bridge of five arches. In the neighbourhood of Peebles, near the village of Romana, on the river Lene, we see the vestiges of two Roman castella, or stationary forts; and a great many terraces on the neighbouring hills, which perhaps have served as itinerary encampments. In the shire of Tweeddale there are many ancient and honourable families of the gentry. Among these, Douglas of Cavers, who was hereditary sheriff of the county, still preserves the standard and the iron mace of the gallant lord Douglas, who fell in the battle of Otterburn, just as his troops had defeated and taken Henry Percy, surnamed *Hotspur*. In the churchyard of Drumelzier, belonging to an ancient branch

of the Hay-family, the famous Merlin is supposed to lie buried. There was an old traditional prophecy, that the two kingdoms should be united when the waters of the Tweed and the Pansel should meet at his grave. Accordingly, the country people observe that this meeting happened in consequence of an inundation at the accession of James VI. to the crown of England.

PEEK, in the sea-language, is a word used in various senses. Thus the anchor is said to be a-peek, when the ship being about to weigh comes over her anchor in such a manner that the cable hangs perpendicularly between the hause and the anchor.

To heave a-peek, is to bring the peek so as that the anchor may hang a-peek. A ship is said to ride a-peek, when lying with her main and fore-yards hoisted up, one end of her yards is brought down to the shrouds, and the other raised up on end; which is chiefly done when she lies in rivers, lest other ships falling foul of the yards should break them. Riding a-broad peek, denotes much the same, excepting that the yards are only raised to half the height.

Peek is also used for a room in the hold, extending from the bitts forward to the stern: in this room men of war keep their powder, and merchant-men their victuals.

PEEL, in the Isle of Man, formerly Holm-town, has a fort in a small island, and a garrison well supplied with cannon. In it are the ancient cathedral, the lord's house, with some lodgings of the bishops, and some other remains of antiquity.

PEER, in general, signifies an equal, or one of the same rank and station: hence in the acts of some councils, we find these words, *with the consent of our peers, bishops, abbots, &c.* Afterwards the same term was applied to the vassals or tenants of the same lord, who were called *peers*, because they were all equal in condition, and obliged to serve and attend him in his courts; and *peers in fiefs*, because they all held fiefs of the same lord.

The term *peers* is now applied to those who are impannelled in an inquest upon a person for convicting or acquitting him of any offence laid to his charge: and the reason why the jury is so called, is because, by the common law and the custom of this kingdom, every person is to be tried by his peers or equals; a lord by the lords, and a commoner by commoners. See the article JURY.

PEER of the Realm, a noble lord who has a seat and vote in the House of Lords, which is also called the *House of Peers*.

These lords are called *peers*, because though there is a distinction of degrees in our nobility, yet in public actions they are equal, as in their votes in parliament, and in trying any nobleman or other person impeached by the commons, &c. See PARLIAMENT.

House of PEERS, or *House of Lords*, forms one of the three estates of parliament. See LORDS and PARLIAMENT.

In a judicative capacity, the house of peers is the supreme court of the kingdom, having at present no original jurisdiction over causes, but only upon appeals and writs of error; to rectify any injustice or mistake of the law committed by the courts below. To this authority they succeeded of course upon the dissolution of

Peers
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Pegasus.

of the *Aula Regia*. For as the barons of parliament were constituent members of that court, and the rest of its jurisdiction was dealt out to other tribunals, over which the great officers who accompanied those barons were respectively delegated to preside, it followed, that the right of receiving appeals, and superintending all other jurisdictions, still remained in that noble assembly, from which every other great court was derived. They are therefore in all cases the last resort, from whose judgment no farther appeal is permitted; but every subordinate tribunal must conform to their determinations: The law reposing an entire confidence in the honour and conscience of the noble persons who compose this important assembly, that they will make themselves masters of those questions upon which they undertake to decide; since upon their decision all property must finally depend. See LORDS, NOBILITY, &c.

PEERS, in the anti-revolution government of France, were twelve great lords of that kingdom; of which six were dukes and six counts; and of these, six were ecclesiastics and six laymen: thus the archbishop of Rheims, and the bishop of Laon and Langres, were dukes and peers; and the bishops of Chalons on the Marne, Noyons, and Beauvais, were counts and peers. The dukes of Burgundy, Normandy, and Aquitaine, were lay peers and dukes; and the counts of Flanders, Champagne, and Toulouse, lay peers and counts. These peers assisted at the coronation of kings, either in person or by their representatives, where each performed the functions attached to his respective dignity: but as the six lay peerages were all united to the crown, except that of the count of Flanders, six lords of the first quality were chosen to represent them: but the ecclesiastical peers generally assisted in person. The title of peer was lately bestowed on every lord whose estate was erected into a peerage; the number of which, as it depended entirely on the king, was uncertain.

PEERESS, a woman who is noble by descent, creation, or marriage. For, as we have noblemen of several ranks, so we may have noblewomen; thus king Henry VIII. made Anne Bullen marchioness of Pembroke; king James I. created the Lady Compton, wife to Sir Thomas Compton, countess of Buckingham, in the lifetime of her husband, without any addition of honour to him; and also the same king made the Lady Finch, viscountess of Maidstone, and afterwards countess of Winchelsea, to her and the heirs of her body: and king George I. made the Lady Schulenberg, duchess of Kendal.

If a peeress, by descent or creation, marries a person under the degree of nobility, she still continues noble: but if she obtains that dignity only by marriage, she loses it, on her afterwards marrying a commoner; yet by the courtesy of England, she generally retains the title of her nobility.

A countess or baroness may not be arrested for debt or trespass; for though in respect of their sex, they cannot sit in parliament, they are nevertheless peers of the realm, and shall be tried by their peers, &c.

PEWIT, in ornithology. See LARUS.

PEGASUS, among the poets, a horse imagined to have wings; being that whereon Bellerophon was

fabled to be mounted when he engaged the Chimera. See CHIMERA.

The opening of the fountain Hippocrene on mount Helicon is ascribed to a blow of Pegasus's hoof. It was feigned to have flown away to heaven, where it became a constellation. Hence

PEGASUS, in astronomy, the name of a constellation of the northern hemisphere, in form of a flying horse. See ASTRONOMY, n° 406.

PEGMARES, a name by which certain gladiators were distinguished, who fought upon moveable scaffolds called *pegmata*, which were sometimes unexpectedly raised, and by this means surprised the people with gladiators in hot contention. They were sometimes so suddenly lifted up as to throw the combatants into the air; and sometimes they were let down into dark and deep holes, and then set on fire, thus becoming the funeral-piles of these miserable wretches; and roasting them alive to divert the populace.

PEGU, a very considerable kingdom of Asia, beyond the Ganges. The country properly so called is but about 350 miles in length from north to south, and as much in breadth from east to west. It is situated on the eastern side of the bay of Bengal, nearly opposite to Arica, and to the north-east of the coast of Coromandel. It is bounded on the north by the kingdoms of Arrakan and Ava; on the east by the Upper and Lower Siam; on the south by part of Siam and the sea; and on the west by the sea and part of Arrakan.

The kingdom of Pegu is said to have been founded about 1100 years ago. Its first king was a seaman; concerning whom and his successors we know nothing till the discovery of the East Indies by the Portuguese in the beginning of the 16th century. In 1518 the throne of Pegu was possessed by one Bressagukan, with whom Antony Correa the Portuguese ambassador solemnly concluded a peace in 1519. This monarch was possessed of a very large and rich empire, nine kingdoms being in subjection to him, whose revenues amounted to three millions of gold. We hear no farther account of his transactions after the conclusion of the treaty with the Portuguese. In 1539 he was murdered on the following occasion: Among other princes who were his tributaries was Para Mander, king of the Barmas. These people inhabited the high lands called *Pangavirau*, to the northward of the kingdom of Pegu. Their prince, by one of the terms of his vassalage, was obliged to furnish the king of Pegu with 30,000 Barmas, to labour in his mines and other public works. As the king used frequently to go and see how his works went forward, and in these journeys took along with him none but his women, the Barmas observing these visits frequently repeated, formed a design of robbing the queen and all the concubines of their jewels; and pursuant to this design, the next time the king visited the works, they murdered him, and having stripped the ladies, fled to their own country.

By this enormity all Pegu was thrown into confusion: but, instead of revenging the death of their king, the people divided everywhere into factions; so that Dacha Rupi, the lawful heir to the crown, found himself unable to maintain his authority. Of these commotions, the king of the Barmas taking the advantage,

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Pern. vantage, not only shook off the yoke, but formed a design of conquering the kingdom of Pegu itself— With this view he invaded the country with an army of more than a million of foot, and 5000 elephants; besides a great fleet which he sent down the river Ava towards Bagou or Pegu, the capital of the empire; while he himself marched thither by land. Just at this time Ferdinand de Mirales arrived at Pegu from Goa with a large galleon richly laden on account of the king of Portugal. As soon as Dacha Rupi heard of his coming, he sent to desire his assistance against the enemy. This he obtained by great presents and promises: and Mirales, setting out in a galliot, joined the king's ships. Had the numbers been any thing near an equality, the superior skill of Mirales would undoubtedly have gained the victory: But the fleet of the Barmas covered the whole river, though as large as the Ganges, while that of Dacha Rupi could scarce be observed in comparison with them. Mirales did every thing that man could do, and even held out alone after the natives had deserted him; but at last, oppressed and overwhelmed with numbers, he was killed, with all his men.

Thus Para Mandara became master of all Pegu; after which he attacked the tributary kingdoms. In 1544 he besieged Martavan, the capital of a kingdom of the same name, then very great and flourishing. The land-forces which he brought against it consisted of 700,000 men, while by sea he attacked it with a fleet of 1700 sail; 100 of which were large galleys, and in them 700 Portuguese commanded by John Cayero, who had the reputation of being a valiant and experienced officer. The siege, however, continued seven months, during which time the Barmas lost 120,000 men; but at last the besieged king, finding himself straitened for want of provisions, and unable to withstand so great a power, offered terms of capitulation. The besiegers would admit of no terms, upon which the distressed king applied to the Portuguese in the service of his enemy; for by their assistance he doubted not to be able to drive away the Barmas. Accordingly, he sent one Seixas to Cayero, intreating him to receive himself, his family, and treasure, on board the four ships he had under his command; offering, on that condition, to give half his riches to the king of Portugal, to become his vassal, and pay such tribute as should be agreed upon. Cayero consulted the principal officers, and in their presence asked Seixas what he thought the treasure might amount to. Seixas answered, that out of what he had seen, for he had not seen all, two ships might be loaded with gold, and four or five with silver. This proposal was too advantageous to be slighted; but the rest of the officers envying the great fortune which Cayero would make, threatened to discover the whole to the king of Barma if he did not reject it. The unhappy king of Martavan had now no other resource but to set fire to the city, make a sally, and die honourably with the few men he had with him: but even here he was disappointed; for by the desertion of 4000 of his troops the enemy were apprised of his design, and prevented it. Thus betrayed, he capitulated with the Barma king for his own life and the lives of his wife and children, with leave to end his days in retirement. All this was readily granted, but the

Pegu. conqueror intended to perform no part of his promise. The city was plundered and burnt, by which above 60,000 persons perished, while at least an equal number were carried into slavery. Six thousand cannon were found in the place; 100,000 quintals of pepper, and an equal quantity of other spices. The day after this destruction, 21 gibbets were erected on an hill adjoining to the city; on which the queen, her children, and ladies, were executed, by hanging them up alive by the feet: however, the queen expired with anguish before she suffered such a cruel indignity. The king, with 50 of his chief lords, was cast into the sea, with stones about their necks. This monstrous cruelty so provoked the tyrant's soldiers, that they mutinied, and he was in no small danger of suffering for it: however, he found means to pacify them; after which he proceeded to besiege Prom, the capital of another kingdom. Here he increased his army to 900,000 men. The queen by whom it was governed offered to submit to be his vassal; but nothing would satisfy the Barma monarch less than her surrender at discretion, and putting all her treasure into his hands. This she, who knew his perfidy, refused to do; on which the city was fiercely assaulted, but greatly to the disadvantage of the Barmas, who lost near 100,000 men. However, the city was at last betrayed to him, when Mandara behaved with his usual cruelty. Two thousand children were slain, and their bodies cut in pieces and thrown to the elephants; the queen was stripped naked, publicly whipped, and then tortured, till she died; the young king was tied to her dead body, and both together cast into a river, as were also 300 other people of quality.

While the tyrant was employed in fortifying the city, he was informed, that the prince of Ava had sailed down the river Queytor with 400 rowing vessels having 30,000 soldiers on board; but that, hearing of the queen's disaster, he stopped at Meletay, a strong fortress about 12 leagues north of Prom, where he waited to be joined by his father the king of Ava with 80,000 men. On this news the Barma king sent his foster-brother Chaumigrem along the river-side with 200,000 men, while he himself followed with 100,000 more. The prince in this emergency burnt his barks, forming a vanguard of the mariners, and, putting his small army in the best position he could, expected the enemy. A most desperate engagement ensued, in which only 800 of the prince's army were left, and 115,000 out of 200,000 Barmas who opposed him were killed. The 800 Avans retired into the fort: but Mandara coming up soon after, and being enraged at the terrible havoc made in his army, attacked the fortress most violently for seven days; at the end of which time, the 800, finding themselves unable to hold out any longer, rushed out in a dark and rainy night, in order to sell their lives at as dear a rate as possible. This last effort was so extremely violent, that they broke through the enemy's troops in several places, and even pressed so hard on the king himself that he was forced to jump into the river. However, they were at last all cut off, but not before they had destroyed 12,000 of their enemies.

Mandara having thus become master of the fort, commanded it to be immediately repaired; and sailed up the river to the port of Ava, about a league from

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the capital, where he burnt between 2000 and 3000 vessels, and lost in the enterprise about 8000 men. The city itself he did not think proper to invest, as it had been newly fortified, was defended by a numerous garrison, and an army of 80,000 men was advancing to its relief. The king also, apprehensive of Mandara's power, had implored the protection of the emperor Siam; offering to become his tributary on condition that he would assist him with his forces in recovering the city of Prom. To this the emperor readily assented; which news greatly alarmed the Barma monarch, so that he dispatched ambassadors to the Kalaminhm or sovereign of a large territory adjacent, requesting him to divert the emperor from his purpose. On the ambassadors return from this court, it appeared that the treaty had already taken effect; but as the season was not yet arrived for invading Ava, Chaumigrem the king's foster-brother was sent with 150,000 men to reduce Sebadi or Savadi the capital of a small kingdom about 130 leagues north-east from Pegu. The general, however, failed in his attempt; and afterwards endeavouring to revenge himself on a town in the neighbourhood, he was surprised by the enemy and put to flight.

In the meantime, the empire of Siam fell into great distractions; the king, together with the heir to the crown, were murdered by the queen, who had fallen in love with an officer, whom she married after her husband's death. However, both of them were soon after killed at an entertainment; and the crown was given to a natural brother of the late king, but a coward and a tyrant. On this Mandara resolved to invade the country; and, his principal courtiers concurring in the scheme, he collected an army of 800,000 men, with no fewer than 20,000 elephants. In this army were 1000 Portuguese, commanded by one James Suarez, who already had a pension of 200,000 ducats a-year from the king of Pegu, with the title of his brother, and governor of the kingdom. With this formidable army he set out in April 1548. His first achievement was the taking of a fortress on the borders of the enemy's country; before which, being several times repulsed, and having lost 3000 of his men, he revenged himself by putting all the women to the sword. He next besieged the capital itself; but though the siege was continued for five months, during which time the most violent attacks were made upon it, the assailants were constantly repulsed with great loss. However, it was still resolved to continue the siege; and a mount of earth was raised, on which were placed 40 pieces of cannon, ready to batter it anew, when, in October, advice was received of a rebellion having broke out in Pegu.

The person who headed the rebels on the present occasion was Shoripam Shay, near a-kin to the former monarch slain twelve years before. He was a religious person, of great understanding, and esteemed a saint. As he was a famous preacher, he made a sermon, in which he set forth the tyranny of the Barmas in such a manner, that he was immediately taken out of the pulpit, and proclaimed king by the people, who, as a token of sovereignty, gave him the title of *Shemindoo*. The first act of sovereignty which he exerted was to cut in pieces 15,000 Barmas, and seize on the treasure; and so agreeable was this

change of government to all ranks of people, that in three weeks time all the strong holds of Pegu fell into his hands.

On this news the king immediately raised the siege in which he was engaged, and in 17 days got to Martavan. Here he was informed, that Shemindoo had posted 500,000 men in different places, in order to intercept his passage; at the same time that he had the mortification to find 50,000 of his best troops deserted. To prevent a greater desertion, after 14 days stay, he departed from Martavan, and soon met Shemindoo at the head of 600,000 men. A desperate engagement followed; in which Shemindoo was entirely defeated, with the loss of 300,000 men. Of the Barma troops were slain 60,000; among whom were 280 Portuguese.

The morning after this victory, the tyrant marched to the city; the inhabitants of which surrendered, on condition of having their lives and effects spared. The kingdom being thus again brought under his subjection, his next step was to punish the principal persons concerned in the rebellion: their heads he cut off, and confiscated their estates, which amounted to no less than ten millions of gold. Others say, that he put all without distinction to the sword, excepting only 12,000, who took shelter in James Suarez's house; that alone affording an asylum from the general slaughter. The plunder was incredible, Suarez alone getting three millions. All these cruelties, however, were insufficient to secure the allegiance of the tyrant's subjects: for in less than three months news was brought that the city of Martavan had revolted; and that the governor had not only declared for Shemindoo, but murdered 2000 Barmas. Mandara then summoned all the lords of the kingdom to meet him with their force, within 15 days, at a place called *Mouchau*, not far from his capital, whither he himself went with 300 men, to wait their arrival. But in the meantime he received intelligence that the shemin or governor of Zatan, a city of some consequence, had submitted to Shemindoo, and also lent him a large sum of gold. The shemin was immediately sent for in order to be put to death: but he, suspecting Mandara's design, excused himself by pretending sickness; after which, having consulted with his friends, he drew together about 600 men; and having with these privately advanced to the place where the king was, he killed him, with the few attendants that were about him at the time. The guards in the court being alarmed with the noise, a skirmish ensued with the shemin's men, in which about 800 were slain on both sides, most of them Barmas. The shemin then retreated to a place called *Pontel*; whither the people of the country, hearing of the death of the king, who was universally hated, resorted to him. When he had assembled about 5000 men, he returned to seek the troops which the late king had with him; and finding them dispersed in several places, easily killed them all. With the Barmas were slain 80 out of 300 Portuguese. The remainder surrendered, with Suarez their leader; and were spared, on condition of their remaining in the service of the shemin.

The shemin, now finding his forces daily increase, assumed the title of *king*; and, to render himself the more popular, gave out that he would exterminate the

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Pegu. the Barmas so effectually, as not to leave one in all the kingdom. It happened, however, that one of those who were with the late king at the time he was murdered, escaped the general slaughter; and, swimming over the river, informed Chaumigrem of the king's death. He had with him 180,000 men, all of them natives of Pegu, excepting 30,000 Barmas. He knew very well, that if the natives had known that the king was dead, he and all his Barmas would have instantly been put to the sword. Pretending, therefore, that he had received orders to put garrisons into several places, Chaumigrem dispatched all the natives into different parts; and thus got rid of those whom he had so much cause to fear. As soon as they were marched, he turned back upon the capital, and seized the king's treasure, together with all the arms and ammunition. He then set fire to the magazines, arsenals, palace, some of whose apartments were ceiled with gold, and 2000 rowing vessels which were on the river. Then destroying all the artillery, he fled with the 30,000 Barmas to his own country, being pursued in vain by the natives of Pegu.

Thus the shemin of Zatan was left in quiet possession of the kingdom; but, by his repeated acts of tyranny and cruelty, he so disgusted his subjects, that many fled to foreign countries, while others went over to Shemindoo, who began now to gather strength again. In the mean time, James Suarez, the Portuguese whom we have often mentioned, lost his life by attempting to ravish a young woman of distinction; the shemin being unable to protect him, and obliged to give him up to the mob, who stoned him to death. The shemin himself did not long survive him; for, being grown intolerable by his oppressions, most of his followers abandoned him, and he was besieged in his capital by Shemindoo with an army of 200,000 men, and soon after slain in a sally: so that Shemindoo now seemed to be fully established on the throne. But in the mean time Chaumigrem, the foster-brother to the deceased king, hearing that Pegu was very ill provided with the means of defence, invaded the kingdom with an army of 300,000 men. Shemindoo met him with three times their number; but his men, being all natives of Pegu, were inferior in strength, notwithstanding their numbers, to the enemy. The consequence was, that Shemindoo was defeated with prodigious slaughter, and Chaumigrem caused himself to be proclaimed king of Pegu. Shortly after, Shemindoo himself was taken; and, after being treated with the utmost cruelty, was beheaded.

The history of Chaumigrem is very imperfect. However, we know that he was a very great conqueror, and not at all inferior in cruelty to his predecessors. He reduced the empire of Siam and Arrakan, and died in 1583; being succeeded by his son named *Pranjinoko*, then about 50 years of age. When this prince ascended the throne, the kingdom of Pegu was in its greatest height of grandeur; but by his tyranny and obstinacy he lost all that his father had gained. He died in 1599, and after his death the kingdom of Pegu became subject to Arrakan. For some time past it has been tributary to the more powerful kingdom of Ava; the sovereigns of which country have hitherto been extremely cautious of permitting Europeans to obtain any settlement among them.

Pegu. The air of Pegu is very healthy, and presently recovers sick strangers. The soil also is very rich and fertile in corn, rice, fruit, and roots; being enriched by the inundations of the river Pegu, which are almost incredible, extending above 30 leagues beyond its channel. It produces also good timber of several kinds. The country abounds with elephants, buffaloes, goats, hogs, and other animals, particularly game; and deer is so plenty in September and October, that one may be bought for three or four pence: they are very fleshy, but have no fat. There is store of good poultry; the cocks are vastly large, and the hens very beautiful. As for fish, there are many sorts, and well tasted. In Pegu are found mines, not only of gold, iron, tin, and lead, or rather a kind of copper or mixture of copper and lead, but also of rubies, diamonds, and sapphires. The rubies are the best in the world; but the diamonds are small, and only found in the craws of poultry and pheasants. Besides, only one family has the privilege of selling them; and none dare open the ground to dig for them. The rubies are found in a mountain in the province of Kablan, or Kapelan, between the city of Pegu and the port of Sirian.

The inhabitants are of an olive, or rather a tawny complexion. The women are branded by some travellers as having shook off all modesty, on account of their exposing some parts of their bodies which ought to be concealed from sight. Some also tell us, that the men wear bells, which at a certain age, *viz.* 25 or 30, or, according to others, when they are capable of making use of women, are inserted on each side the virile member between the skin and the flesh, which is opened for that purpose, and healed in seven or eight days. The Peguers may be ranked among the most superstitious of all mankind. They maintain and worship crocodiles; and will drink nothing but the waters of the ditches where those monstrous animals harbour. By thus exposing themselves to the manifest hazard of their lives, they have frequently the misfortune to be devoured. They have five principal festivals in the year, called *sapans*, which they celebrate with extraordinary magnificence. In one of them the king and queen make a pilgrimage about 12 leagues from the city, riding on a triumphal car, so richly adorned with jewels, that it may be said without an hyperbole that they carry about with them the value of a kingdom. This prince is extremely rich; and has in the chapel of his palace idols of inestimable value, some of them being of massy gold and silver, and adorned with all sorts of precious stones. The talapoins, or priests of this country, have no possessions; but such is the respect paid them by the people, that they are never known to want. They preach to them every Monday not to commit murder; to take from no person any thing belonging to him; to do no hurt; to give no offence; to avoid impurity and superstition; but above all, not to worship the devil: but these discourses have no effect in the last respect. The people, attached to manicheism, believe that all good comes from God; that the devil is the author of all the evil that happens to men; and that therefore they ought to worship him, that he may not afflict them. This is a common notion among the Indian idolaters.

The inhabitants of Pegu are accused by some authors with being slovenly in their houses, and nasty in their diet,

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diet, on account of their seasoning their victuals with fish, a composition made of stinking fish, reduced to a consistency like mustard, so nauseous and offensive that none but themselves can endure the smell of it. Balbi says, he could sooner bear the scent of stinking carrion; and yet with this they season their rice, and other soups, instead of oil or butter. As they have no wheat in this country, their bread is rice made into cakes. Their common drink is water, or a liquor distilled from cocoa-nut water. They are a spirited and warlike people; open, generous, and hospitable; and have neither the indolence nor the jealousy of most other eastern nations.

The men here, as in most eastern countries, buy their wives, or pay their parents a dowry for them. They have an odd custom; which is to offer their daughters to strangers, and hire them out for a time: some say they hire out their wives in the same manner. These marriages for a time are well regulated, and often prove very beneficial to the occasional husband. Most of the foreigners who trade hither, marry a wife for the time of their stay. In case of a separation, the father is obliged to take care of the boys, and the mother of the girls. We are told that no woman is looked upon the worse, but rather the better, for having had several European husbands: nay, we are told, that no person of fashion in Pegu, from the gentleman to the king, will marry a maiden, till some acquaintance or stranger has had the first night's lodging with her.

In Pegu, the inheritance of all land is in the king: he is likewise the heir of all his subjects who die without issue; but in case they have children, two-thirds go to them, and the rest to his majesty.

In the government of this country, despotism prevails in its full extent, and despotism too of the very worst kind; for the inhabitants are under the absolute power of a set of petty tyrants, who are themselves nothing more than slaves to the king of Ava. As they have little or no emolument, except what they can raise by extortion, it is exercised in the most unlimited manner. They take cognizance of all disputes between individuals that come to their ears, without the case being laid before them by either of the parties; and on whatever side the cause is determined, there is a never-failing charge brought in against both, for justice, as they express it; and this price of justice is often three or four times greater than the value of the matter in agitation.

But the inconveniences that this government labours under are not only those of despotism; the unhappy subjects feel those of anarchy too. There are about twenty persons concerned in the government of Rangoon, who, though one is subordinate to another, and though matters of the first consequence are determined in a council of the whole, can yet act separately; and any one member of this body can by his own authority give out orders, which no inhabitant of Pegu dares to disobey. Those orders may be contrary to the sense of the whole body; in which case they are, indeed, reversed in council: but then there are instances, and

* Hunter's
cause ac-
count of the
kingdom of
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"I myself, (says a late traveller,*) observed one, of such orders being notwithstanding repeated more than once by the same person, and obeyed each time, till they were again reversed: nor was any redress obtained by

the party aggrieved, or any effectual measures taken to prevent such a contempt of authority for the future."

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When a person falls sick, we are told that they generally make a vow to the devil, from whom they believe all evil comes. Then a scaffold is built, and victuals are spread on the top of it to solace Old Nick, and render him propitious. This feast is accompanied with lighted candles and music; and the whole is managed by an undertaker called the *devil's father*.

The commodities exported from this country are gold, silver, rubies, musk, benjamin, long-pepper, tin, lead, copper; lakka, or gum-lac, whereof they make hard wax; rice; rice-wine; and some sugar-canes, of which they would have plenty, but that the elephants eat them. It may be observed, that under the name of *rubies*, the Peguers comprise topazes, sapphires, amethysts, and other stones; which they distinguish by saying the blue, the violet, and the yellow rubies. The true ruby is red, transparent, or sparkling, inclining near the surface to the violet of the amethyst. Cotton cloths from Bengal and Coromandel, with some striped silks, are best for the Pegu market, and silver of any sort will go off there: for the king, in return for his eight and a half *per cent.* duty on it, allows the merchants to melt it down, and put what copper alloy they please in it. They wear none of our European commodities in Pegu but hats and ribbons. The gentry will give extravagant prices for fine beaver hats, which they wear without any cocks. They are no less fond of ribbons flowered with gold and silver, which they wear round their hats.

As to the religion of the Peguers, it is the same at bottom with that which prevails over the rest of India and Tibet; only varies in dress somewhat in different countries, according to the humour or interest of the priests. They hold the existence of one supreme God, of whom they make no image; but they have many inferior created gods, whose images are set up in the temples for the laity to worship. Not content with these, we are told they worship the devil also. Many are seen to run about the streets every morning, with rice in one hand and a torch in the other, crying aloud, that they are going to give the devil his breakfast, that he may not hurt them all the day. Besides the manichean doctrine of two principles, one the author of good and the other of evil, from whence their worshipping the devil has its rise, they believe an eternal succession of worlds without creation. The Peguers hold the doctrine of the Metempsychosis, or transmigration of the human soul, which, after passing through the bodies of various animals, shall attain to the perfection and felicity of their gods; which in effect is no other than a state of annihilation. They have a strong opinion of the sanctity of apes and crocodiles, inasmuch that they believe the persons to be perfectly happy who are devoured by them. Their temples are of a conic form, and some of them a quarter of a mile round. They observe a great many festivals, some of which are called *sapan*. The images of their inferior gods are in a sitting posture, with their legs across, and toes of equal length: their arms and hands very small in proportion to their bodies; their faces longer than human; their ears long, and the lappets very thick. The congregation bow to them when they come in and when

Peguntium when they go out; and that is all the worship which they pay to them. The priests of Pegu, called *tala-poins*, are a sort of mendicant friars. They observe celibacy; and eat but once a-day; living in the woods, in a sort of nests or cages built on the tops of trees for fear of the tygers. They preach frequently, lead very innocent lives, and are very hospitable and humane.

The king of Pegu's revenues arise chiefly from the rent of lands, of which he is the sole proprietor. Another branch of it are the duties paid for the commodities imported or exported. In a word, he is judged the richest monarch in the world, next to the emperor of China.

Travels
into Dal-
matia.

PEGUNTIIUM (anc. geog.), Ptolemy; *Piguntiae*, (Pliny); a town or citadel of Dalmatia, on the Adriatic, opposite to the island Brattia, scarce five miles off, and 40 miles to the east of Salonae. According to Fortis, a mountain, a large hollow, and submarine springs are seen here. "This hollow (says he) seems to have been excavated by some ancient river. The springs which bubble up from under the sea are so considerable, that they might pass for the rising again of a river sunk under ground. Vnullia has the same derivation as the word *Vril*, which in Slavonian signifies a fountain; and this etymology, rendering the name of Vnullia the *Berullia* of Porphyrogenitus analagous to that of Peguntium, since *Πηγὴ* and *Vril* are synonymous, induces me to believe, that the castle named Peguntium by ancient geographers was situated in this place, and not at the mouth of the Cettina. No remarkable vestiges of antiquity now exist on the spot; yet it is evident, by the quantity of fragments of vases, tiles, and sepulchral inscriptions now and then dug up, that this tract of coast was well inhabited in the Roman times. The principal cause why the tracts of ancient habitations cannot be discovered about Vnullia, is the steepness of the hill above it, and the quantity of stones brought down from thence by the waters. The mouth of the hollow of Vnullia is dreaded by seamen, on account of the sudden impetuous gusts of wind that blow from thence, and in a moment raise a kind of hurricane in the channel between the Primorie and the island of Brazza, to the great danger of barks surprised by it."

PEINE FORT ET DURE, (Lat. *pæna fortis et dura*), signifies a special punishment inflicted on those who, being arraigned of felony, refuse to put themselves on the ordinary trial, but stubbornly stand mute; it is vulgarly called *pressing to death*. See **ARRAIGNMENT**.

PEIRCE (James), an eminent dissenting minister, was born at Wapping, in London, in the year 1674, and was educated at Utrecht and Leyden; after which he spent some time at Oxford, in order to enjoy the benefit of frequenting the Bodleian library. He then for two years preached the Sunday-evening's lecture at the meeting house in Miles-Lane, London, and then settled at Cambridge. In 1713 he was removed to a congregation at Exeter, where he continued till the year 1718: when the Calvinists among the dissenters proposing a subscription to articles of faith to be signed by all the dissenting ministers in the kingdom, several articles were proposed to him and Mr John Hallet, another dissenting minister at Exeter, in order to their subscribing them, they both refused, imagining this proceeding of their dissenting brethren to be an unworthy imposition on religious liberty and private

judgment; for which they were ejected from their congregation. Upon this, a new meeting was opened for them at Exeter, of which Mr Peirce continued minister till his death, in 1726. He was a man of the strictest virtue, exemplary piety, and great learning. He wrote, 1. *Exercitatio philosophica de Homamertia Anaxagorea*. 2. Thirteen pieces on the Controversy between the Church of England and the Dissenters. 3. Ten pieces on the Controversy about the Ejectment at Exeter. 4. Six pieces on the Doctrine of the Trinity. 5. A Paraphrase and Notes on the Epistles of St Paul to the Colossians, Philippians, and Hebrews. 6. An Essay in favour of giving the Eucharist to Children. 7. Fourteen Sermons.

PEIRESC (Nicolas Claude Fabri), born in 1580, was descended from an ancient and noble family, seated originally at Pisa in Italy. At ten years of age, he was sent to Avignon, where he spent five years in the Jesuits college, in the study of what in Scotland and on the Continent is called *humanity*. From Avignon he was, in 1595, removed to Aix, and entered upon the study of philosophy. In the interim, he attended the proper masters for dancing, riding, and handling arms; in all which, though he performed the lessons regularly, it was with reluctance: for this being done only to please an uncle, whose heir he was to be, he never practised by himself, esteeming all the time lost that was not spent in the pursuits of literature. During this period, his father being presented with a medal of the emperor Arcadius, which was found at Belgenfer, Peiresc begged the favour of it; and, charmed with deciphering the characters in the exergue, and reading the emperor's name, he carried the medal with a transport of joy to his uncle; who for his encouragement gave him two more, together with some books upon the subject. This is the epoch of his application to antiquities, for which he became afterwards so famous. In 1596, he was sent to finish his course of philosophy under the Jesuits at Tournon, where he turned his attention particularly to cosmography, as being necessary to the understanding of history, abating, however, nothing of his application to antiquity, in which he was much assisted by Petrus Rogerus, one of the professors, and a skilful medalist: nor did he omit the study of humanity in general, wherein he was the master and instructor of a brother who was with him. But to do all this he was obliged to sit up late at nights; and so much labour and attention, as he was naturally of a tender constitution, increased the weakness of his stomach formerly contracted, and for which he had used a kind of digestive powder. Being recalled by his uncle in 1597, he returned to Aix, and entered there upon the study of the law; which he prosecuted, however, so as to find leisure to visit and converse frequently with Peter A. R. Bagarr, a most skilful antiquary, who was afterwards made master of the jewels to Henry IV.

The following year he went again to Avignon, to carry on his course of law under one Peter David; who, being well skilled likewise in antiquities, was pleased to see Peiresc join this study to that of the law. But Ghibertus of Naples, auditor to Cardinal Aquaviva, fed his curiosity the most, in showing him some rarities, such as he had never seen before. Ghibertus also lent him Goltrius's *Treatise upon Coins*, and advised

Peiresc.

Peirese.

visited him to go into Italy, especially to Rome, where he would meet with curiosities to satisfy his most ardent wishes. Accordingly, his uncle having procured a proper governor, he and his brother set out upon that tour Sept. 1599; and passing through Florence, Bononia, and Ferrara, when he had stayed a few days at Venice, he fixed his residence at Padua, in order to complete his course of law. But once a quarter, going to Venice to get cash for bills of exchange, he took these opportunities of introducing himself to the most distinguished literati there; and was particularly caressed by F. Contarin, procurator of St Mark, who was possessed of a curious cabinet of medals, and other antiquities, without knowing the value of them. This was fully shown to him by Peirese, who likewise explained the Greek inscriptions upon his medals, and the monumental stones. After a year's stay at Padua, he set out for Rome, and arrived there Oct. 1600, in order to be in time for seeing the jubilee: to celebrate which, the Porta Sancta would be opened in the beginning of the next year. He passed six months in this city, viewing the numberless curiosities there, and in cultivating the friendship of Galileo, by whom he was much beloved. This friendship led him to carry his researches into astronomy and natural philosophy; and he was present when Fabricius ab Aquapendente, out of a parcel of eggs upon which a hen was sitting, took one every day, to observe the gradual formation of the chick from first to last. From this time it was generally acknowledged, that he had taken the helm of learning into his hand, and began to guide the commonwealth of letters.

Having now spent almost three years in Italy, he began to prepare for his departure; and in the end of 1602, having packed up all the rarities, gems, &c. which he had procured, and put them into the road to Marseilles, he left Padua, and, crossing the Alps to Geneva, went to Lyons; where receiving money, he made a handsome present to his governor, who took the route of Paris. From Lyons he went to Montpellier, to improve himself in the law under Julius Parius. From Montpellier he dispatched more rarities to his uncle, who sending for him home, he arrived at Aix in November; but, bringing Parius along with him, he obtained leave to return to Montpellier in a few days. He waited upon Parius back again, under whom he continued pursuing his law studies till the end of 1603, when he returned to Aix, at the earnest request of his uncle, who, having resigned to him his senatorial dignity, had ever since the beginning of the year laboured to get the king's patent. The degree of doctor of law was a necessary qualification for that dignity. Peirese, therefore, having kept the usual exercise, took that degree Jan. 18. 1604, when the aforesaid patent was given in to the senate, and ordered to be recorded: yet Peirese procured leave not to be presently entered into the list of senators. The bent of his inclination was not so much to business as to advance arts and sciences, and to assist all the promoters of learning. For this purpose, he resolved to lead a single life; so that when his father had concluded a match for him with a respectable lady, he begged to be excused.

In 1605, he accompanied G. Varius, first president of the senate at Aix, who was very fond of him, to Paris; whence, having visited every thing curious, he

crossed the water, in company with the king's ambassador, 1606, to England. Here he was very graciously received by king James I.; and having seen Oxford, and visited Camden, Sir Robert Cotton, Sir Henry Saville, and other learned men, he passed over to Holland; and after visiting the several towns and universities, with the literati in each, he went through Antwerp to Brussels, and thence back to Paris, to see the ceremony of the Dauphin's baptism; which being solemnized Aug. 24. he returned home in September 1606, being expected for the ordering of the family affairs.

Presently after this, he purchased the barony of Rians; and at the solicitation of his uncle, having approved himself before that assembly, he was received a senator on the 1st of July 1607. Jan. 1608 he lost his uncle; and the following year, falling himself into a dangerous fever, recovered by eating musk-melons before supper, for which he had conceived a longing. He was ordered by his physician to eat them before his meals without bread, and to drink a glass of pure wine upon them. He continued this method all his life afterwards; and grew so fond of them, that, though he could abstain from any other meat as he listed, yet towards them he professed he was unable to master himself. He frequently experienced, that in the musk-melon season he was never troubled with the gravel. In 1618, having procured a faithful copy of "the Acts of the Monastery of Maren in Switzerland," he published a second edition of that work. As it was written in defence of the royal line of France against Theodoric Piespordius, who had attempted to prove the title of the Austrian family to the French crown by right of succession, he was, upon this publication, nominated the same year, by Louis XIII. abbot of Sancta Maria Aquistrensis. He stayed in France till 1623; when, upon a message from his father, now grown old and sickly, he left Paris, where he had spent seven years and some months. He arrived at Aix in October; and not long after presented to the court a patent from the king, permitting him to continue in the function of his ancient dignity, and to exercise the office of a secular or lay person, notwithstanding that, being an abbot, he had assumed the character of a churchman. To this the court of parliament not assenting, decreed unanimously, that, being already admitted into the first rank, he should abide perpetually therein; not returning, as the custom of the court was, to the inferior auditory, wherein trials are usually had of criminal cases. In 1625, he buried his father, who had been long afflicted with the gout. In 1627, he prevailed with the archbishop of Aix to establish a post thence to Lyons, and so to Paris and all Europe; by which the correspondence constantly held with the literati everywhere was much facilitated. In 1629, he began to be much tormented with the strangury and hæmorrhoides; and in 1631, having completed the marriage of his nephew Claudius with Margaret Alresia, a noblewoman of the county of Avignon, he bestowed upon him the barony of Rianty, together with a grant of his senatorial dignity, only reserving the function to himself for three years. But the parliament not waiting his surrendry of it, he resented that affront so heinously, that he procured, in 1635, letters patent from the king to be restored, and

Peirese.

Peirese, to exercise the office for five years longer, which happened to be till his death: for being seized, June 1637, with a fever that brought on a stoppage of urine, this put an end to his life on the 24th of that month, in his 57th year.

Gassendi's
Life of
Peirese, in
English.
Lond.
1657.

The character of Peirese may be summed up in a few words. His person was of a middle size, and of a thin habit: his forehead large, and his eyes grey; a little hawk-nosed; his cheeks tempered with red; the hair of his head yellow, as also his beard, which he used to wear long; his whole countenance bearing the marks of uncommon and rare courtesy and affability. In his diet he affected cleanliness, and in all things about him; but nothing superfluous or costly. His clothes were suitable to his dignity; yet he never wore silk. In like manner, the rest of his house was adorned according to his condition, and very well furnished; but he neglected his own chamber. Instead of tapestry, there hung the pictures of his chief friends and of famous men, besides innumerable bundles of commentaries, transcripts, notes, collections from books, epistles, and such like papers. His bed was exceeding plain, and his table continually loaded and covered with papers, books, letters, and other things; as also all the seats round about, and the greatest part of the floor. These were so many evidences of the turn of his mind; in respect to which, the writer of his euloge compares him to the Roman Atticus; and Bayle, considering his universal correspondence and general assistance to all the literati in Europe, dashed it out luckily enough, when he called him "the attorney general of the literary republic." The works which he published are, "*Historia provinciarum Galliarum Narbonensis*;" "*Nobilium ejusdem provinciarum familiarum Origines, et separatim Fabricae*;" "*Commentarii rerum omnium memoria dignarum sua ætate gestarum*;" "*Liber de ludicris naturæ operibus*;" "*Mathematica & astronomica varia*;" "*Observationes mathematicæ*;" "*Epistolæ ad S. P. Urbanum VIII. cardinales Barberinos, &c.*;" "*Authores antiqui Græci et Latini de ponderibus et mensuris*;" "*Elogia et epitaphia*;" "*Inscriptiones antiquæ et novæ*;" "*Genealogia domus Austriacæ*;" "*Catalogus librorum biblioth. reg.*;" "*Poemata varia*;" "*Nummi Gallici, Saxonici, Britannici, &c.*;" "*Linguae orientales, Hebræa, Samaritana, Arabica, Egyptiaca, et Indices librorum harum linguarum*;" "*Observationes in varios auctores*." It is remarkable, that though Peirese bought more books than any man of his time, yet his collection left was not large. The reason was, that, as fast as he purchased, he kept continually making presents of them to such learned men as he knew they would be useful to.

PEKIN, the capital city of the empire of China, in Asia, where the emperor generally resides. It is situated in a very fertile plain, 20 leagues distant from the great wall. This name, which signifies the *northern court*, is given to it, to distinguish it from another considerable city called *Nanking*, or the *southern court*. The emperor formerly resided in the latter; but the Tartars, a restless and warlike people, obliged this prince to remove his court to the northern provinces, that he might more effectually repel the incursions of those barbarians, by opposing to them a numerous militia which he generally keeps around his person. It is an exact square, and divided into two parts; namely, that which contains the emperor's palace, which is in

the new city, or, as it is called, the Tartar's city, because it is inhabited by Tartars ever since they conquered this empire; the other, called the *Old City*, is inhabited by the Chinese. The circuit of both these together is 52 Chinese lys, each of which contains 240 geometrical paces; being, without the suburbs, full six leagues in circumference, according to the most accurate measurement made by order of the emperor.

Those who have paid attention to the population of this place, reckon the number of inhabitants at 2,000,000, though there are others that double that number.

Grosier tells us, "that the height and enormous thickness of the walls of the Tartar city excite admiration; twelve horsemen might easily ride abreast upon them; they have spacious towers raised at intervals, a bow-shot distant from one another, and large enough to contain bodies of reserve in case of necessity. The city has nine gates, which are lofty and well arched. Over them are large pavilion-roofed towers divided into nine stories, each having several apertures or port-holes: the lower story forms a large hall for the use of the soldiers and officers who quit guard, and those appointed to relieve them. Before each gate a space is left of more than 360 feet: this is a kind of place of arms, inclosed by a semicircular wall equal in height and thickness to that surrounding the city. The great road, which ends here, is commanded by a pavilion-roofed tower like the first, in such manner, that, as the cannon of the former can batter the houses of the city, those of the latter can sweep the adjacent country. The streets of Pekin are straight, about 120 feet wide, a full league in length, and bordered with shops. It is astonishing to see the immense concourse of people that continually fills them, and the confusion caused by the prodigious number of horses, camels, mules, and carriages, which cross or meet each other. Besides this inconvenience, one is every now and then stopped by crowds, who stand listening to fortune-tellers, jugglers, ballad-singers, and a thousand other mountebanks and buffoons, who read and relate stories calculated to promote mirth and laughter, or distribute medicines, the wonderful effects of which they explain with all the eloquence peculiar to them.

"People of distinction oblige all their dependents to follow them. A mandarin of the first rank is always accompanied in his walks by his whole tribunal; and, to augment his equipage, each of the inferior mandarins in his suit is generally attended by several domestics. The nobility of the court, and princes of the blood, never appear in public without being surrounded by a large body of cavalry; and, as their presence is required at the palace every day, their train alone would be sufficient to create confusion in the city. It is very singular, that in all this prodigious concourse no women are ever seen: hence we may judge how great the population of China must be, since the number of females in this country, as well as everywhere else, is superior to that of the other sex.

"As there is a continual influx of the riches and merchandize of the whole empire into this city, the number of strangers that resort hither is immense. They are carried in chairs, or ride on horseback; the latter is more common: but they are always attended by a guide, acquainted with the streets, and who knows

Pekin.

Grosier's
Description
of China.

Pekin.

knows the houses of the nobility and principal people of the city. They are also provided with a book, containing an account of the different quarters, squares, remarkable places, and of the residence of those in public offices. In summer there are to be seen small temporary shops, where people are served with water cooled by means of ice; and one finds everywhere eating-houses, with refreshments of tea and fruits. Each kind of provision has a certain day and place appointed for its being exposed to sale.

"The governor of Pekin, who is a Mantchew Tartar, is styled Governor of the Nine Gates. His jurisdiction extends not only over the soldiers, but also over the people in every thing that concerns the police. No police can be more active; and it is surprising to see, among an infinite number of Tartars and Chinese mixed together, the greatest tranquillity prevail. It is rare, in a number of years, to hear of houses being robbed, or people assassinated. All the principal streets have guard-rooms, and soldiers patrol night and day, each having a sabre hanging from his girdle, and a whip in his hand, to correct, without distinction, those who excite quarrels or cause disorder. The lanes are guarded in the same manner; and have latticed gates, which do not prevent those from being seen who walk in them: they are always kept shut during the night, and seldom opened even to those who are known; if they are, the person to whom this indulgence is granted must carry a lanthorn, and give a sufficient reason for his going out. In the evening, as soon as the soldiers are warned to their quarters by beat of drum, two centinels go and come from one guard-room to another, making a continual noise with a kind of castanet, to show that they are not asleep. They permit no one to walk abroad in the night-time. They even examine those whom the emperor dispatches on business; and if their reply gives the least cause of suspicion, they have a right to convey them to the guard-room. The soldiers in each of the guard-rooms are obliged to answer every time the centinels on duty call out.

"It is by these wise regulations, observed with the greatest strictness, that peace, silence, and safety reign throughout the whole city. The governor is also obliged to go the round; and the officers stationed on the walls, and in the towers over the gates (in which are kept large kettle-drums that are beat every time the guard is relieved), are continually dispatching subalterns to examine the quarters belonging to the gates where they are posted. The least neglect is punished next morning, and the officer who was on guard is cashiered. This police, which prevents nocturnal assemblies, would appear no doubt extraordinary in Europe, and in all probability would not be much relished by our young men of fortune and ladies of quality. But the Chinese think justly: they consider it to be the duty of the magistrates of a city to prefer good order and public tranquillity to vain amusements, which generally occasion many attempts against the lives and property of the citizens. It is true, the support of this police costs the emperor a great deal; for part of the soldiers we have mentioned are maintained for this purpose only. They are all infantry, and their pay is generally very high. Their employment consists not only in watching for those who may occasion disturb-

ance in the day-time, or walk abroad during the night; they must also take care that the streets are kept clean and swept every day; that they are watered morning and evening in time of dry weather; and that every nuisance is removed. They have orders also to assist in this labour themselves; and to clear the kennels, that the water may have a free course."

The walls of the emperor's palace, including that and the gardens, are about two miles in length. "Although (says Grosier) the Chinese architecture has no resemblance to that of Europe, the imperial palace of Pekin does not fail to strike beholders by its extent, grandeur, and the regular disposition of its apartments, and by the singular structure of its pavilion-roofs, ornamented at each corner with a carved plat-band, the lower extremity of which is turned upwards. These roofs are covered with varnished tiles of so beautiful a yellow colour, that, at a distance, they make as splendid an appearance as if they were gilded. Below the upper roof there is another of equal brilliancy, which hangs sloping from the wall, supported by a great number of beams, daubed over with green varnish, and interspersed with gilt figures. This second roof, with the projection of the first, forms a kind of crown to the whole edifice. The palace is a small distance from the south gate of the Tartar city. The entrance to it is through a spacious court, to which there is a descent by a marble staircase, ornamented with two large copper lions, and a balustrade of white marble. This balustrade runs in the form of a horse-shoe, along the banks of a rivulet, that winds across the palace with a serpentine course, the bridges over which are of marble. At the bottom of this first court arises a façade with three doors: that in the middle is for the emperor only; the mandarins and nobles pass through those on each side. These doors conduct to a second court, which is the largest of the palace: it is about 300 feet in length, and 50 in breadth. An immense gallery runs round it, in which are magazines, containing rich effects, which belong to the emperor as his private property; for the public treasure is entrusted to a sovereign tribunal called *Hou-pou*. The first of these magazines is filled with plate and vessels of different metals; the second contains the finest kinds of furs; the third, dresses lined with sable, ermine, minever, and foxes skins, which the emperor sometimes gives in presents to his officers; the fourth is the depository of jewels, pieces of curious marble, and pearls fished up in Tartary; the fifth, consisting of two stories, is full of wardrobes and trunks, which contain the silk stuffs used by the emperor and his family; the rest are filled with bows, arrows, and other pieces of armour taken from the enemy or presented by different princes.

"The royal hall, called *Tai-hotien*, or the Hall of the Grand Union, is in this second court. It is built upon a terrace about 18 feet in height, incrustated with white marble, and ornamented with balustrades of excellent workmanship. Before this hall all the mandarins range themselves, when they go, on certain days, to renew their homage, and perform those ceremonies that are appointed by the laws of the empire. This hall is almost square, and about 130 feet in length. The ceiling is carved, varnished green, and loaded with gilt dragons. The pillars which support the

Pekin.

Pekin.

roof within are six feet in circumference towards the base, and are coated with a kind of mastich varnished red; the floor is partly covered with coarse carpets, after the Turkish manner; but the walls have no kind of ornament, neither tapestry, lustres, nor paintings.

"The throne, which is in the middle of the hall, consists of a pretty high alcove, exceedingly neat. It has no inscription but the character *ching*, which the authors of this relation have interpreted by the word *holy*: but it has not always this signification; for it answers better sometimes to the Latin word *eximius*, or the English words *excellent*, *perfect*, *most wise*. Upon the platform opposite to this hall stand large vessels of bronze, in which incense is burnt when any ceremony is performing. There are also chandeliers shaped like birds and painted different colours, as well as the wax-candles that are lighted up in them. This platform is extended towards the north, and has on it two lesser halls; one of them is a rotunda that glitters with varnish, and is lighted by a number of windows. It is here that the emperor changes his dress before or after any ceremony. The other is a saloon, the door of which opens to the north: through this door the emperor must pass, when he goes from his apartment to receive on his throne the homage of the nobility; he is then carried in a chair, by officers dressed in long red robes bordered with silk, and caps ornamented with plumes of feathers. It would be difficult to give an exact description of the interior apartments which properly form the palace of the emperor, and are set apart for the use of his family. Few are permitted to enter them but women and eunuchs."

The temples and the towers of this city are so numerous, that it is difficult to count them. Provisions of all kinds are exceeding plentiful, they being, as well as the merchandises, brought from other parts by means of canals cut from the rivers, and always crowded with vessels of different sizes, as well as from the adjacent country. An earthquake which happened here in 1731 buried above 100,000 persons in the ruins of the houses which were thrown down. E. Long. 116. 41. N. Lat. 39. 54.

Mod. Un.
Hist. v. vii.

We have already, under the article OBSERVATORY, mentioned the famous observatory in this city, of which we shall give this further account from the Universal History. "The Chinese had thought nothing in the universe could equal in magnificence this famous place; and one of the most celebrated mathematicians of the royal academy of Paris hath made no scruple to represent it as one of the greatest prodigies of art and ingenuity, of beauty and magnificence; and yet, when this celebrated structure came to be viewed by more proper and unbiassed judges, it appears to have been of little worth as to its ancient machines, and less as to its situation; and that all that is now valuable in it is owing to the improvements made by Father Verbiest

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a Flemish Jesuit, who caused a new set of instruments to be made, with extraordinary care, neatness, and precision.

"This fabric stands in a court of a moderate extent, and is built in the form of a square tower, contiguous to the city wall on the inside, and raised but ten or twelve feet above its bulwark. The ascent up to the top is by a very narrow staircase; and on the platform above were placed all the old instruments, which, though but few, took up the whole room, till Father Verbiest introduced his new apparatus, which he disposed in a more convenient order. These are large, well cast, and embellished; and were the neatness of the divisions answerable to the work, and the telescopes fastened to them according to the new method, they would be equal to those of Europe; but the Chinese artificers were, it seems, either too negligent, or incapable of following his directions. As to the old instruments, they were, by order of the emperor Kang-hi, set aside as useless, and laid in the hall near the tower, where they may be seen through a cross-barred window, all covered with rust, and buried in oblivion.

"In this famed observatory there are five mathematicians employed night and day, each in a proper apartment on the top of the tower, to observe all that passes over their heads: one of them is gazing towards the zenith, and the others towards the four points of the compass, that nothing may escape their notice. Their observations extend not only to the motions of the heavenly bodies, but to fires, meteors, winds, rain, thunder, hail, storms, and other phenomena of the atmosphere; and these are carefully entered in their journals, and an account of them is brought every morning to the surveyor of the mathematics, and registered in his office."

PELAGIANS, a Christian sect who appeared about the fifth or end of the fourth century. They maintained the following doctrines. 1. That Adam was by nature mortal, and, whether he had sinned or not, would certainly have died. 2. That the consequences of Adam's sin were confined to his own person. 3. That new-born infants are in the same situation with Adam before the fall. 4. That the law qualified men for the kingdom of heaven, and was founded upon equal promises with the gospel. 5. That the general resurrection of the dead does not follow in virtue of our Saviour's resurrection. 6. That the grace of God is given according to our merits. 6. That this grace is not granted for the performance of every moral act; the liberty of the will, and information in points of duty, being sufficient, &c. The founder of this sect was

PELAGIUS, a native of Great Britain; but whether of England, Scotland, or Wales, is as uncertain as it is immaterial (A). He was born towards the close of the fourth century, and educated in the monastery

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of

(A) Dr Henry thinks he was born in North Wales; that his real name was Morgan, of which Pelagius is a translation; and that he was born on the 13th of November A. D. 354, the same day with his great antagonist St Augustin. The same learned historian gives us the following account of Pelagius and his great coadjutor Celestius. "He received a learned education in his own country, most probably in the great monastery of Banchor near Chester, to the government of which he was advanced A. D. 404. He was long esteemed and loved by St Jerome and St Augustin, who kept up a friendly correspondence with him by letters before

Pelagius. of Banchor, in Wales, of which he became a monk, and afterwards abbot. In the early part of his life he went over to France, and thence to Rome, where he had the insolence to promulgate certain opinions somewhat different from those of the infallible church. His morals being irreproachable, he gained many disciples; and the dreadful heresy made so rapid a progress, that, for the salvation of souls, it became necessary for the pope to exert his power. Pelagius, to avoid the danger, in the year 409 passed over to Sicily, attended by his friend and pupil Celestius. In 411 they landed in Africa, continued some time at Hippo, and were present at the famous conference between the Catholics and Donatists which was held at Carthage in 412. From thence they travelled to Egypt; and from Egypt, in 415, to Palestine, where they were graciously received by John bishop of Jerusalem. In the same year Pelagius was cited to appear before a council of seventeen bishops, held at Diospolis. They were satisfied with his creed, and absolved him of heresy. The African bishops, however, being displeased with their proceedings, appealed to the Roman pontiff: he first approved, and afterwards condemned, the opinions of Pelagius, who, with his pupil Celestius, was publicly excommunicated; and all the bishops who refused to subscribe the condemnation of the Pelagian heresy were immediately deprived. What became of him after this period is entirely unknown; but it seems very probable that he retired to Banchor, and died abbot of that monastery. He wrote, 1. *Expositionum in epist. Paulinas*, lib. xiv. 2. *Epistola ad Demetriadem de virginitate*.

3. *Explanationis symboli ad Damasum*. 4. *Epistola ad Pelagios*. 5. *De libero arbitrio*. These and many other fragments are scattered among the works of St. Jerome. They are also collected by Garnerius, and published in Append. op. Mercatoris, p. 373. *Cave*.

PELAGOSA, an island in the Adriatic, which, together with several rocks that appear above water near it, are the remains of an ancient volcano. "I will not assure you (says Fortis) that it was thrown up out of the sea like several other islands in the Archipelago, though there is some ground to suspect this to have been the case; because we find no precise mention of it in the most ancient geographers. It should seem that it ought not to be confused with the Diomedee, from which it is 30 miles distant; yet it is not impossible that they have reckoned it among them. The lava which forms the substance of this island, is perfectly like the ordinary lava of Vesuvius, as far as I could discover in passing near it. If a naturalist should land there, and visit on purpose the highest parts of the island, perhaps we might then know whether it has been thrown up by a submarine volcano, as the island near Santerini was in our age; or if we ought to believe it the top of some ancient volcanic mountain, of which the roots and sides have been covered by the waters, which divided Africa from Spain, forming the straits of Gibraltar; an invasion that no one can doubt of who has examined the bottoms and shores of our sea. The Lissan fishermen say, that Pelagosa is subject to frequent and violent earthquakes; and the aspect of the island proves,

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before they discovered the heretical pravity of his opinions; for Pelagius, being a cautious and artful man, for some time vented his peculiar notions as the sentiments of others, without discovering that they were his own. At length, however, he threw off the mask, and openly published and defended his doctrines at Rome about the beginning of the fifth century. This involved him in many troubles, and drew upon him the indignation of his former friends St. Jerome and St. Augustine, who wrote against him with great acrimony. He is acknowledged, even by his adversaries, to have been a man of good sense and great learning, and an acute disputant, though they load him with the most bitter reproaches for his abuse of these talents. His personal blemishes are painted in very strong colours; and he is represented by these good fathers, in the heat of their zeal, as a very ugly fellow, 'broad-shouldered, thick-necked, fat-headed, lame of a leg, and blind of an eye.' Even the most northern parts of this island (Britain) produced some men of learning in this period. Celestius, the disciple and friend of Pelagius, was a Scotsman, who made a prodigious noise in the world by his writings and disputations about the beginning of the fifth century. He defended and propagated the peculiar opinions of his master Pelagius with so much learning, zeal, and success, that those who embraced these opinions were frequently called Celestians. Before he became acquainted with these doctrines he wrote several books, which were universally admired for their orthodoxy, learning, and virtuous tendency. After he had spent his youth in his own country in a studious privacy, he travelled for his further improvement to Rome, where he became acquainted with Rufinus and Pelagius, and was by them infected with their heresies. From that time he became the most indefatigable and undaunted champion of these heresies, and thereby brought upon himself the indignation of the orthodox fathers of these days, who gave him many very bad names in their writings. St. Jerome, whose commentaries on the Ephesians he had presumed to criticise, calls him 'an ignorant, stupid fool, having his belly swelled and distended with Scots pottage; a great, corpulent, barking dog, who was fitter to kick with heels than to bite with his teeth; a Cerberus, who, with his master Pluto (Pelagius), deserved to be knocked on the head, that they might be put to eternal silence.' Such were the flowers of rhetoric which these good fathers employed against the enemies of the orthodox faith! But candour obliges us to observe, that this was perhaps more the vice of the age in which they lived than of the men. Both Pelagius and Celestius were very great travellers; having visited many different countries of Asia and Africa, as well as Europe, with a view to elude the persecutions of their enemies, and to propagate their opinions. It is no inconsiderable evidence of their superior learning and abilities, that their opinions gained great ground in all the provinces both of the eastern and western empire, in spite of the writings of many learned fathers, and the decrees of many councils against them. 'The Pelagian and Celestian heresy (says Photius) not only flourished in great vigour in the West, but was also propagated into the East.'

Pelaiah at first sight, that it has suffered many revolutions; for it is rugged, ruinous, and subverted."

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Pelatiah.

PELALIAH, a Levite (Nehem. viii. 7. x. 10.) He was one of the principal Levites that returned from captivity, and was one of those that signed the covenant that Nehemiah renewed with the Lord.

PELALIAH, son of Amazi and father of Jeroham, of the family of Pashur son of Malchiah, of all whom mention has been made: he was of the race of the priests (Nehem. xi. 12.)

PELASGI. See PELASGIOTIS.

PELASGIA (Pliny); the ancient name of *Lefbos*; so called from the Pelasgi, its first inhabitants (Diodorus Siculus.) Also the ancient name of *Peloponnesus*, from Pelasgius, a native of the country (Nicolaus Damascenus, Ephorus).

PELASGICUM (Pausanias, Pliny); the north wall of Athens; so called from the builders, the Pelasgi. There was an execration pronounced on any that should build houses under this wall; because the Pelasgi, while dwelling there, entered into a conspiracy against the Athenians (Thucydides).

PELASGIOTIS, a third part of Thessaly, (Strabo); so called from a very ancient people, the Pelasgi, called *Pelasgiota* (Ptolemy); who formerly, together with the Æolians, occupied Thessaly, and thence that part was called *Pelasgicum Argos*; besides many other parts of Greece. Their name *Pelasgi*, or *Pelargi*, denoting storks, was given them from their wandering roving life (Strabo). The poets extend the appellation to Greeks in general. *Pelasgus*, the epithet. Some of the inhabitants of Crete were called *Pelasgi* (Homer); who thus also calls the neighbouring people to the Cilicians in Troas. The Pelasgi were originally of Arcadia, (Hesiod); but Æschylus makes Argos, near Mycenæ, their country. The Pelasgiotis was situated between Pieria and Macedonia to the north and west, Thessaliotis to the south, and Magnesia to the east, (Strabo, Pliny.)

PELATÆ, were free-born citizens, among the Athenians, who by poverty were reduced to the necessity of serving for wages. During their servitude they had no vote in the management of public affairs, as having no estate to qualify them; but this restriction was removed whenever they had released themselves from their servile situation, which they were allowed to do when able to support themselves. While they continued servants, they had also a right to change their masters. We find them sometimes distinguished by the name of *Thetæ*.

PELATIAH, son of Hananiah, and father of Ishi, of the tribe of Simeon. He subdued the Amalekites upon the mountain of Seir (1 Chron. iv. 42.) The time of this action is unknown.

PELATIAH, son of Benaiah, a prince of the people, who lived in the time of Zedekiah king of Judah, and opposed the wholesome advice given by Jeremiah, to submit to king Nebuchadnezzar. Ezekiel (xi. 1, 2, 3, 4.) being a captive in Mesopotamia, had a vision, in which he saw five and twenty men at the door of the temple of Jerusalem, among which were Jaazaniah the son of Azur, and Pelatiah the son of Benaiah, who were the most remarkable. Then the Lord said to him, "Son of man, these are the men that have thoughts of iniquity, and who are forming pernicious

designs against this city, saying; Have not the houses been built a long time? Jerusalem is the pot, and we are the flesh. Thus saith the Lord: You have made great havock in this city, and have filled its streets with dead bodies. These men are the flesh, and the city is the pot. But as for you, I will make you come forth from the middle of this city, and I will make you perish by the hand of your enemies." As he was prophesying in this manner, Pelatiah the son of Benaiah died.

PELE (Stephanus). There were two towns of this name in Thessaly; the one subject to Eurypylus, the other to Achilles; both extinct. *Peleus* the gentilitious name (*id.*)

PELEG, son of Eber, was born in the year of the world 1757. The scripture says his father gave him the name of Peleg, signifying division, because in his time the earth began to be divided (Gen. xi. 16. x. 25.); whether it was that Noah had begun to distribute the earth among his descendants, some years before the building of Babel; or that Peleg came into the world the same year that Babel was begun, and at the division of languages; or that Eber by a spirit of prophecy gave his son the name of *Peleg* some years before the tower of Babel was begun, is not absolutely certain. That which here perplexes the interpreters is, first, that Peleg came into the world not above 100 years after the deluge. But it should seem, that the number of men was not then sufficient for such an undertaking as that of Babel. Secondly, Joktan the brother of Peleg had already thirteen sons at the time of this dispersion, which happened after the confusion of Babel (Gen. x. 26, 27, 28, &c.) Peleg being born in the thirty-fourth year of Eber (Gen. xi. 16.), it is impossible his brother Joktan should have such a number of children at the birth of Peleg. It seems therefore that he was not born at the time of the dispersion. To this may be answered, that Moses has there enumerated the names of the thirteen sons of Joktan (in Gen. x. 26.) by way of anticipation, though they were not born till a good while after the confusion at Babel; but as they possessed a very large country, it was convenient to take notice of them, and to name them among the other descendants of Noah, who divided the provinces of the east among themselves. However this may have been, at the age of thirty years Peleg begat Reu; and he died at the age of 239.

PELETHITES. The Pelethites and Cherethites were famous under the reign of King David. They were the most valiant men in the army of that prince, and had the guard of his person. See Ezekiel xxv. 16. Zephaniah ii. 5. 1 Samuel xxx. 14. 2 Samuel xv. 18. xx. 7. *Patrick's Comm. Pool's Annot. and Delany's Hist. of the Life of David.*

PELETHRONII, a name or epithet given to the Lapithæ, either because they inhabited the town of Pelethronium at the foot of mount Pelion in Thessaly, or because one of their number bore the name of *Pelethronius*. It is to them, we are told, that mankind are indebted for the invention of the bit with which they tamed their horses with so much dexterity.

PELETHRONIUM (Nicander and Scholiast); a town of Thessaly, situated in a flowery part of mount Pelios; and hence the appellation *throna*, signifying

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Pelethronium.

Peleus.

"flowers." Lucan says the Centaurs were natives of that place; to whom Virgil assigns mount Othrys. Most authors, however, ascribe the breaking of horses to the Centaurs. Some make the Lapithæ and Centaurs the same; others a different people; allowed however to be both of Thessaly. Their story is greatly involved in fable. See LAPITHUS.

PELEUS, in fabulous history, a king of Thessaly, son of Æacus and Endeis, the daughter of Chiron. He married Thetis one of the Nereids, and was the only mortal man who ever married an immortal. He was concerned in the murder of his brother Phocus, and was therefore obliged to leave his father's dominions. He fled to the court of Eurytus the son of Actor, who reigned at Phthia, or according to the opinion of Ovid, the truth of which is questioned, to Ceyx king of Trachinia. He was purified of his murder by Eurytus, with the usual ceremonies, and the king gave him his daughter Antigone in marriage. After this, as Peleus and Eurytus went to the chase of the Calydonian boar, the father-in-law was accidentally killed by an arrow which his son-in-law had aimed at the beast. This unfortunate accident obliged him to banish himself from the court of Phthia, and he went to Iolchos, where he was also purified of the murder of Eurytus by Acastus the king of the country. His residence at Iolchos was short: Aftydamia the wife of Acastus fell in love with him; but when she found him insensible to her passionate declarations, she accused him of attempts upon her virtue. The king her husband partly believed the accusations of his wife; but not willing to violate the laws of hospitality, by putting him instantly to death, he ordered his officers to conduct him to mount Pelion, on pretence of hunting, and there to tie him to a tree and to leave him a prey to the wild beasts of the place. The orders of Acastus were faithfully obeyed; but Jupiter knowing the innocence of his grandson Peleus, ordered Vulcan to set him at liberty. As soon as he had been delivered from danger, Peleus assembled his friends in order to punish the ill treatment which he had received from Acastus. He took Iolchos by force, drove the king from his possessions, and put to death the wicked Aftydamia. On the death of Antigone, Peleus made love to Thetis, of whose superior charms Jupiter himself had been enamoured. His pretensions were rejected; for as he was but a mortal, the goddess fled from him with the utmost abhorrence, and the more effectually to evade his inquiries, she generally assumed the shape of a bird, or a tree, or of a tygress. Peleus's passion was fanned by refusal; he offered a sacrifice to the gods; and Proteus informed him, that to obtain Thetis he must surprise her while she was asleep in her grotto, near the shores of Thessaly. This advice was immediately attended to; and Thetis, unable to escape from the grasp of Peleus, at last consented to marry him. Their nuptials were celebrated with the greatest solemnity, all the gods attending and making them each the most valuable presents. The goddess of Discord was the only one of the deities who was absent; and she punished this seeming neglect by throwing an apple into the midst of the assembly of the gods, with the inscription of *Detur pulchriori*. The celebrated Achilles was the fruit of this marriage, whose educa-

tion was early entrusted to the Centaur Chiron, and afterwards to Phœnix, the son of Amyntor. Achilles, it is well known, went to the Trojan war, at the head of his father's troops; and Peleus gloried in having a son who was superior to all the Greeks in valour and intrepidity. His death, however, was the source of great grief to Peleus; but Thetis, to comfort her husband, promised him immortality, and ordered him to retire into the grottoes of the island of Leuce, where he should see and converse with the manes of his son. Peleus had a daughter called *Polydora*, by Antigone.

PELEW ISLANDS, a cluster of small islands situated between the latitudes of 5° and 7° north, and the longitudes 134° and 136° east. Various conjectures have been formed respecting the time of their first discovery by Europeans. Mr Keate, the editor of the only voyage in which we have any account of their climate, soil, and produce, together with the manners of their inhabitants, thinks they were first noticed by the Spaniards from the Philippines, and by them named *Palos* from the number of trees growing in them resembling the masts of ships. This conjecture has been vehemently opposed by a critic, who affirms that the whole of Mr Keate's introduction is erroneous, and that the islands in question were first discovered by a French Jesuit named *Pere Papin*. The Jesuit, he imagines, was directed to them by one of the inhabitants, who had found his way to the Moluccas, where he was baptized. They are said to have been again noticed by *P. Centova* in 1724, who saw at Agdane, the capital of the Merian islands, some of the inhabitants; and from their account gives a description not very favourable of these harmless islanders. Centova's description is to be found in the 15th volume, and the relation of the discovery by *P. Pepin* in the 11th volume, of *Lettres Edifiantes et Curieuses*, published at Paris 1781.

The latest and most authentic account of them, however, is given from the Journals of Captain Wilson of the *Antelope*, a packet belonging to the East India company, which was wrecked upon one of them in August 1783. This ship was fitted out in England by the court of directors in the summer 1782, as was then generally understood, for a secret expedition. Whatever may have been her destination, as she was proceeding from Macao in squally weather, the man who, on the night of the 10th of August, had the look out, suddenly called out *Breakers!* But the sound of the word had scarce reached the ears of the officer on deck, before the ship struck and stuck fast; and in less than an hour bulged and filled with water. Having secured the gunpowder, small arms, bread, and such other provisions as were liable to be spoiled by water, Captain Wilson, after many difficulties, effected a landing. The crew of the *Antelope* consisted of 33 Europeans beside the captain, and 16 Chinese; and the only possible means by which they could be delivered from an island, which at first appeared to them uninhabited, was by building a ship capable of transporting them to the nearest European settlement in that quarter of the globe. Whilst they were meditating upon this undertaking, the natives appeared on the second day after their arrival; and their intercourse with them was facilitated by means which ap-

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near as singular as they were providential. Captain Wilson had a servant recommended to him at Macao, who spoke both the Malay and English languages perfectly well; and they had not been long at Pelew before they had the good fortune to meet with a Malay, who had been thrown by a tempest upon this very spot about a year before, and had made himself acquainted with the language of the country; so that by this extraordinary event each party had an interpreter who could readily explain their wants and desires, and by that means prevent a number of misconceptions which might have arisen from making use of signs and gestures only.

The natives are all of a deep copper colour, going perfectly naked. They are of a middling stature, very straight, muscular, and well formed; but their legs, from a little above their ankles to the middle of their thighs, are tattooed so very thick, as to appear dyed of a far deeper colour than the rest of their skin. Their hair is of a fine black, long, and rolled up behind, in a simple manner, close to the back of their heads, which appeared both neat and becoming; but few of them had beards, it being the general custom to pluck them out by the roots.

They began by stroking the bodies and arms of the English, or rather their waistcoats and coat sleeves, as if they doubted whether the garment and the man were not of the same substance; and as the Malay explained the circumstances to them, our people were greatly surprised at the quickness with which they seemed to comprehend every information he gave them. The next thing they noticed was our people's white hands, and the blue veins of their wrists; the former of which they seemed to consider as artificial, and the other as the English manner of tattooing. After being satisfied in this particular, they expressed a further wish to see their bodies; and, among other things, were greatly surprised at finding hair on their breasts, it being considered by them as a great mark of indelicacy, as it is their custom to eradicate it from every part of the body in both sexes.

They afterwards walked about, testifying great curiosity at every thing they saw, but at the same time expressing a fear that they might be thought too intruding. As our people were conducting them to the tents, one of the natives picked up a bullet, which had been casually dropped on the ground, and immediately expressed his surprise, that a substance so small to the eye should be so very ponderous to the touch; and on their entering the tent, a large Newfoundland dog, and a spaniel which had been tied up there to prevent their being lost, set up a most violent barking, and the natives a noise but little less loud, which at first it was not easy to account for. They ran in and out of the tent, and seemed to wish that they might be made to bark again. This the Malay soon explained to be the effect of their joy and surprise, as these were the first large animals they had ever seen, there being no quadrupeds of any species on these islands, except a very few grey rats in the woods.

After some time it was agreed on by Captain Wilson and his people, that some of the crew should be sent to the king of the place, in order to solicit his friendship, and intreat his permission to build a vessel that might carry them back to their own country.

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This business was allotted to the captain's brother; and during his absence, Raa Kook, the king's brother, and several of the natives, remained with our people. This amiable chief seemed to place an entire confidence in those he was among; he endeavoured to accommodate himself to their manners; would sit at table as they did, instead of squatting on his hams; and inquired particularly into the principles and causes of every thing he observed about him, lending his personal assistance in all that was going forward, and even desiring the cook to let him aid him in blowing the fire.

In order to conciliate their affections, Captain Wilson had presented Arra Kooker, another of the king's brothers, with a pair of trowsers; but having conceived a greater passion for a white shirt, one was immediately given to him; which he had no sooner put on, than he began to dance and jump about with so much joy, that every body was diverted by his singular gestures, and the contrast which the linen formed with his skin. This prince was about 40, of a short stature, but so plump and fat that he was nearly as broad as he was long. He possessed an abundant share of good humour, and a wonderful turn for mimicry; and had besides a countenance so lively and expressive, that though our people at this time were strangers to almost all he said, yet his face and gestures made them accurately comprehend whatever he was describing.

After three or four days, Abba Thulle the king arrived with a great retinue. He was received with every mark of respect by the ship's company, who were exercised before him, and fired three volleys in different positions. The surprise of the natives, their hooting, hallooing, jumping, and chattering, produced a noise almost equal to the discharge of the muskets; and when one of the men shot a bird, which was done to display the effect of their arms, the surprise it occasioned was wonderful. Some of the natives ran for it, and carried it to the king, who examined it with great attention, but was unable to comprehend how it could be wounded, not having seen any thing pass out of the gun.

Raa Kook expressed great impatience to show the king whatever had impressed his own mind; and taking his brother by the hand, led him to a grindstone which was fixed behind one of the tents. He immediately put it in motion, as he had frequently done before; at the rapidity of which the king was greatly astonished, particularly when he was informed that it would sharpen iron. Captain Wilson ordered a hatchet to be brought and ground, that they might more readily perceive its operation, when Raa Kook eagerly seized the handle, and began turning it, appearing highly delighted to let his brother see how well he understood it. The whole appeared like something supernatural; but the circumstance which most bewildered their ideas was, how the sparks of fire could come, and how a stone so well wetted could become so soon dry.

The king then visited the different tents, and inquired about every thing he saw: all was novelty, and of course interested his attention. When he got to the tent where the Chinese men were, who had been brought with them from Macao, Raa Kook, whose re-
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tentive mind never lost a single trace of any thing he had been informed of, acquainted the king that these were a people quite different from the English, and that he had learnt there were many other nations besides these interspersed through the world, some of which fought with guns and other with boarding-pikes, an instrument which he held very cheap in comparison with the former.

When the king heard his brother discoursing about a variety of nations, who all spoke differently, and had before him the example of the Chinese, whose language was not the same with the English, he appeared instantly thoughtful and serious, as if struck by conceptions which had never before crossed his mind. He remained a while pensive and bewildered; and this circumstance impressed on every one at the time an idea that there was every reason to imagine that there had never been a communication between those people and any other nation: and indeed it is evident, that if Pere Papia did really visit them in 1710, they had before 1783 lost the remembrance of every trace of European manners. This indeed is not surprising, as they had no other record than knots similar to the quipes of Peru at the landing of the Spaniards.

Raa Kook would now show his brother the kitchen, which was in the hollow of a rock, a little above the cove. It was at the time when the cook was preparing dinner; and though the implements were exceedingly scanty, an iron pot, a tea kettle, a tin sauce-pan, with a poker, a pair of tongs, and a frying-pan, were here of sufficient consequence to excite admiration; nor were the bellows now forgotten by Raa Kook, who taking them up, as he explained their use to the king, seemed ambitious to let his brother see what an adept he was at blowing. The little bald cook, who was always close shaven, and never wore any thing on his head, was likewise pointed out to the king as an object of merriment and curiosity.

Sometime after this the king requested five of Captain Wilson's men to attend him in a war he was going to make against the inhabitants of a neighbouring island called *Oroolong*, who, as he said, had done him an injury. But before this request was made known, he had long struggled with a delicacy of sentiment which no one would have expected to find in regions so disjoined from the rest of mankind. This was no other than that it might prove a temporary inconvenience to the unfortunate strangers who had sought his protection, and might be considered by them as an ungenerous proceeding. It was, however, no sooner made known, than Captain Wilson instantly complied; and every face, which had before been clouded with doubt and apprehension, became immediately brightened and gay.

In this enterprise little more was done than braving their enemies, stripping some cocoa-nut trees of their fruit, and carrying off a number of yams and other provisions; but in another, which was undertaken against the island of Artingall, they were more successful, and showed signs of the same sanguinary disposition which some demon has infused into the whole human race. Nine prisoners of war who had been taken upon this occasion were cruelly put to death; and notwithstanding the English strongly remonstrated against this proceeding, all the arguments they could use were

of no avail. In justification of their conduct, they alleged the necessity of doing it for their own security, declaring that they had formerly only detained them as menial servants, but that they always found means to get back to their own country, and return with such a force as frequently made great depredations.

Having given this general account of the character and conduct of these hitherto unknown people, we now proceed to lay before our readers what we have learned of their government, customs, manners, and arts, together with a description of the face of their country. In this the editor of Captain Wilson's voyage must be our guide; and if our narrative do not satisfy the man of science, it is to be observed, that the Antelope was not a ship sent out purposely to explore undiscovered regions, nor were there people on board properly qualified to estimate the manners of a new race of men; they had amongst them no philosophers, botanists, or draughtsmen, experienced in such scientific pursuits as might enable them to examine with judgment every object which presented itself. Distress threw them upon these islands; and while they were there, all their thoughts were occupied on the means of liberating themselves from a situation of all others the most afflicting to the mind, that of being cut off for ever from the society of the rest of the world.

It, however, clearly appears, from their uniform testimony, that at Pelew the king was considered as the first person in the government.

"He was looked up to as the father of his people; and though divested of all external decorations of royalty, had every mark of distinction paid to his person. His *rupacks* or chiefs approached him with the greatest respect; and his common subjects, whenever they passed near him, or had occasion to address him, put their hands behind them, and crouched towards the ground. Upon all occurrences of moment, he convened the *rupacks* and officers of state; their councils were always held in the open air, where the king first stated the business upon which he had assembled them, and submitted it to their consideration. Each *rupack* delivered his opinion, but without rising from his seat; and when the matter before them was settled, the king standing up put an end to the council.

"When any message was brought him, whether in council or elsewhere, if it came by one of the common people, it was delivered at some distance in a low voice to one of the inferior *rupacks*, who, bending in an humble manner at the king's side, delivered it in the same manner with his face turned aside. His commands appeared to be absolute, though he acted in no important business without the advice of his chiefs; and every day in the afternoon, whether he was at Pelew or with the English, he went to sit in public for the purpose of hearing any requests, or of adjusting any difference or dispute which might have arisen among his subjects."

But these, according to our editor, seldom happened; for as their real wants were but few, and they saw nothing to create artificial ones, every one was chiefly occupied with his own humble pursuits; and as far as the ship's crew, who remained among them about three months, could decide, they appeared to conduct themselves towards each other with the greatest civility and benevolence; never wrangling or entering into quarrels.

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some contentions, as is customary among those who call themselves a polished and enlightened people. Even when children showed a disposition of this kind, they strongly marked their displeasure, by stifling with rebuke their little animosities.

The character of the king is thus drawn by the editor: "The excellent man who reigned over these sons of nature, showed himself in every part of his conduct firm, noble, generous, and benevolent; there was a dignity in all his deportment, a gentleness in all his manners, and a warmth and sensibility about his heart, that won the love of all who approached him. Nature had bestowed on him a contemplative mind, which he had improved by those reflections that good sense dictated and observation confirmed. The happiness of his people seemed to be always in his thoughts. In order more effectually to stimulate them to useful labour, he had himself learnt all the few arts they possessed, and was looked on in some of them to be the best workman in his dominions. Placed as he was by Providence in its obscurer scenes, he lived beloved by his chiefs, and revered by his people; over whom, whilst he preserved a dignity which distinguished his superior station, he reigned more as the father than the sovereign. The eyes of his subjects beheld their naked prince with as much awe and respect as those are viewed with who govern polished nations, and are decorated with all the dazzling parade and ornaments of royalty; nor was the purple robe or the splendid diadem necessary to point out a character which the masterly hand of nature had rendered so perfect."

Next in power to the king was his brother Raa Kook, who was official general of all his forces. It was his duty to summon the rupacks to attend the king for whatever purpose they were wanted. He was also his presumptive heir; the succession of Pelew not going to the king's children till it had passed through his brothers; so that after the demise of Abba Thulle, the sovereignty would have descended to Raa Kook; on his demise to Arra Kooker; and on the death of this last it would have reverted to Qui Bill, the king's eldest son, when Lee Boo, his second son, of whom we have much to say, would have become the hereditary general.

The office of first minister is described as follows: "The king was always attended by a particular chief or rupack, who did not appear to possess any hereditary office, but only a delegated authority. He was always near the king's person, and the chief who was always first consulted; but whether his office was religious or civil, or both, our people could not learn with any certainty. He was not considered as a warrior, or ever bore arms, and had only one wife, whereas the other rupacks had two. The English were never invited to his house, or introduced into it, although they were conducted to those of almost every other chief."

Of the rupacks it is observed, "That they could only be regarded as chiefs or nobles; they were not all of the same degree, as was plain by a difference in

the bone (A) they wore: they generally attended the king, and were always ready at his command to accompany him on any expedition with a number of canoes properly manned, and armed with darts and spears, who were to remain with him till they had his permission to return home with their dependents. In this part of their government we may trace an outline of the feudal system; but from the few opportunities our people had of investigating points of internal government, it appeared that the titles of *rupacks* were personal badges of rank and distinction; nor did they apprehend they were hereditary honours, unless in the reigning family, who must of necessity be of this class."

As to property, it was understood, "That the people possessed only such as arose from their work and labour, but no absolute one in the soil, of which the king appeared to be general proprietor. A man's house, furniture, or canoe, was considered as his private property, as was also the land allotted him, as long as he occupied and cultivated it; but whenever he removed with his family to another place, the ground he held reverted to the king, who gave it to whom he pleased, or to those who solicited to cultivate it."

All that part of the island which they had an opportunity of seeing is said to have been well cultivated. It was covered with trees of various kinds and sizes, many of which must have been very large, as they made canoes of their trunks, some of which were capable of carrying 28 or 30 men. Among the timber trees was noticed the ebony, and a tree which when pierced or wounded yielded a thick white liquor of the consistence of cream. "They had also a species of the manchineel tree, in cutting down of which our people frequently got blistered and swelled; the inhabitants pointed out the cause, saying it was owing to their being sprinkled by the sap. This they reckoned among the unlucky trees, and advised our people against the use of it."

But the most singular tree noticed at Pelew, was one in its size and manner of branching not unlike our cherry-tree, but in its leaves resembling the myrtle. Its peculiarity was, that it had no bark, but only an outward coat of about the thickness of a card, which was darker than the inside, though equally close in texture. Its colour was nearly that of mahogany, and the wood was so extremely hard, that few of the tools which the English had could work it. They also found cabbage-trees, the wild bread-fruit, and another tree whose fruit something resembled an almond. But yams and cocoa nuts, being their principal articles of sustenance, claimed their chief attention.

The island Coorooraa, of which Pelew is the capital, likewise produced plantains, bananas, Seville oranges and lemons, but neither of them in any considerable quantity. None of the islands which the English visited had any kind of grain. As to birds, they had plenty of common cocks and hens, which, though not domesticated, kept running about near their houses and plantations; and what appears extremely singular is, that the natives had never made any use of them, till

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(A) This was a mark of rank worn upon the wrist, with which Captain Wilson was invested by the king; but what animal it came from our people could not learn.

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till our people told them they were excellent eating. Pigeons they accounted a great dainty; but none but those of a certain dignity were permitted to eat of them. The English left them two geese, which were the only remains of their live stock.

From the description of the country it appears to be very mountainous; but some of the valleys are represented as extensive and beautiful, affording many delightful prospects. The soil being very rich, produces a great abundance of grass, which, as there are no cattle to eat it, grows very high, and was scorched and burnt up by the sun. Our people saw no river at Pelew; their supplies of fresh water being obtained from small streams and ponds, of which there are a great many.

From this account of the scanty produce of these islands, it is evident that no luxury reigned among their inhabitants, whose principal article of food appears to be fish; they had no salt, nor did they make use of sauce or any seasoning in any thing they eat. Their drink was also as simple as their diet; it principally consisted of the milk of the cocoa nut; but upon particular occasions they used a kind of sweet drink and sherbet, which latter had the addition of some juice of orange.

The islands appeared to be populous, though to what extent could not be ascertained. Their houses were raised about three feet from the ground, upon stones which appeared as if hewn from the quarry. The interior part of them was without any division, the whole forming one great room, which rose in a ridge like our barns, the outside being thatched thick and close with bamboos or palm leaves. All their implements, utensils, weapons of war, and canoes, are much of the same kind with those which were found in the South Sea islands.

In their marriages they allow a plurality of wives, though in general not more than two. When a woman is pregnant, the utmost attention is paid to her; but upon other occasions no more respect is shown to one sex than the other. "One of our people endeavouring to make himself agreeable to a lady belonging to one of the rupacks, by what we should call a marked assiduity, Arra Kooker, with the greatest civility, gave him to understand that it was not right to do so."

They have places particularly appropriated to sepulture; their graves being made nearly the same as they are in our country churchyards. The corpse is attended only by women, who at the place of interment make a great lamentation. The men, however, assemble round the body before it is carried to the grave, on which occasion they preserve a solemn silence; "their minds, from principles of fortitude or philosophy, being armed to meet the events of mortality with manly submission, divested of the external testimony of human weakness."

On the article of religion our editor observes, "That, among all the race of men whom navigation has brought to our knowledge, few appear to be without a sense of something like religion, however it may be mixed with idolatry or superstition. And yet our people, during their continuance with the natives of Pelew, never saw any particular ceremonies, or observed any thing that had the appearance of public worship.

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But though there was not found on any of the islands they visited any place appropriated to religious rites, it would perhaps be going too far to declare that the people of Pelew had absolutely no idea of religion. Independent of external testimony, there may be such a thing as the religion of the heart, by which the mind may in awful silence be turned to contemplate the God of Nature; and though unblest by those lights which have pointed to the Christian world an unerring path to happiness and peace, yet they might, by the light of reason only, have discovered the efficacy of virtue, and the temporal advantages arising from moral rectitude.

"Superstition is a word of great latitude, and vaguely defined: though it hath in enlightened ages been called the offspring of ignorance, yet in no time hath it existed without having some connection with religion. Now the people of Pelew had beyond all doubt some portion of it, as appeared by the wish expressed by the king when he saw the ship building, that the English would take out of it some particular wood, which he perceived they had made use of, and which he observed was deemed an ill omen, or unpropitious.

"They had also an idea of an evil spirit, that often counteracted human affairs. A very particular instance of this was seen when Mr Barker, a most valuable member in the English society, fell backwards from the side of the vessel, whilst he was on the stocks: Raa Kook, who happened to be present, observed that it was owing to the unlucky wood our people had suffered to remain in the vessel, that the evil spirit had occasioned this mischief to Mr Barker."

They likewise appeared to entertain a strong idea of divination, as was evident from the ceremonies they practised before they undertook any enterprise of moment. A few occurrences, which are mentioned in the course of the narrative, would also lead us to believe that they could not be altogether unacquainted with the nature of religious worship; for when they were present at the public prayers of the English, they expressed no surprise at what was doing, but seemed desirous to join in them, and constantly preserved the most profound silence. The general even refused to receive a message from the king which arrived during divine service. And upon another occasion, when Captain Wilton told Lee Boo, that good men would live again above, he replied, with great earnestness, "All same Pelew; bad men stay in earth; good men go into sky; become very beautiful;" holding his hand up, and giving a fluttering motion to his fingers. Some later voyagers, however, have affirmed, that these people, notwithstanding their superstition, have no notion whatever of a Deity; a circumstance to which it is extremely difficult to give full credit.

The most wonderful circumstance in the history of this people, except that last mentioned, are the acuteness of their understanding, their hospitality, and the implicit confidence which they placed in utter strangers. That their manners were pleasing, and their society not disagreeable, is evident from the conduct of Madan Blanchard, one of the seamen, who, when the vessel was built and ready to take her departure with his Captain and his companions, was left behind at his own particular request. That they had the fullest confidence in Captain Wilton and his crew, is put beyond

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yond a doubt by the behaviour of the king and Raa Kook when their guests were to leave them. Raa Kook solicited his brother's permission to accompany the English, but from prudential motives was refused. The sovereign, however, resolved to entrust his second son Lee Boo to Captain Wilson's care, that he might improve his mind, and learn such things as at his return would benefit his country.

The instructions which he gave the young man, and the fortitude which he showed upon this occasion, would have done honour to the most enlightened mind. Upon delivering him to Captain Wilson, he used these expressions: "I would wish you to inform Lee Boo of all things which he ought to know, and make him an Englishman. The subject of parting with my son I have frequently revolved; I am well aware that the distant countries he must go through, differing much from his own, may expose him to dangers, as well as diseases, that are unknown to us here, in consequence of which he may die; I have prepared my thoughts to this: I know that death is to all men inevitable; and whether my son meets this event at Pelew or elsewhere is immaterial. I am satisfied, from what I have observed of the humanity of your character, that if he is sick you will be kind to him; and should that happen, which your utmost care cannot prevent, let it not hinder you, or your brother, or your son, or any of your countrymen, returning here; I shall receive you, or any of your people, in friendship, and rejoice to see you again." How noble! This is the language of a king, a father, and a philosopher, who would have been delighted to see his son with European accomplishments. But, alas! the subsequent history of this amiable youth must force a tear from the eye of every reader whose heart is not callous to the genuine feelings of nature and humanity. As soon as they arrived at Macao, the house into which he first entered, and the different articles of furniture, fixed him in silent admiration; but what struck his imagination most was the upright walls and flat ceilings of the rooms, being utterly unable to comprehend how they could be so formed. When he was introduced to the ladies of the family, his deportment was so easy and polite, that it could be exceeded by nothing but his abundant good nature; and at his departure, his behaviour left on the mind of every one present the impression, that, however great the surprise might be which the scenes of a new world had awakened in him, it could hardly be exceeded by that which his own amiable manners and native polish would excite in others.

They were now conducted to the house of an English gentleman, who introduced them into a large hall, which was lighted up, with a table in the middle, covered for supper, and a sideboard handsomely decorated. Here a new scene burst at once upon Lee Boo's mind; he was all eye, all admiration. The vessels of glass particularly rivetted his attention; but when he surveyed himself in a large pier glass at the upper end of the hall, he was in raptures with the deception. It was in truth, to him, a scene of magic, a fairy tale.

Soon after the people of the vessel came on shore, some of them went to purchase things they were in want of; in doing which they did not forget Lee Boo, who was a favourite with them all. Among the trinkets they

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brought him was a string of large glass beads, the first sight of which almost threw him into an ecstasy: he hugged them with a transport which could not have been exceeded by the interested possessor of a string of oriental pearls. His imagination suggested to him that he held in his hand all the wealth the world could afford him. He ran with eagerness to Captain Wilson to show him his riches, and begged he would get him a Chinese vessel to carry them to the king his father, that he might see what the English had done for him; adding, that if the people faithfully executed their charge, he would at their return present them with one or two beads as a reward for their services.

Having no quadrupeds at Pelew, the sheep, goats, and other cattle, which he met with at Macao, were viewed with wonder; but soon after, seeing a man pass the house on horseback, he was so much astonished, that he wanted every one to go and look at the strange sight. After the matter, however, was explained to him, he was easily persuaded to get upon horseback himself; and when he was informed what a noble, docile, and useful animal it was, he besought the captain to send one to his uncle Raa Kook, as he was sure it would be of great service to him.

Omitting a number of other particulars of this kind, which excited his curiosity and showed the excellent disposition of his heart, we shall follow him to England, the country from which he was never to return. Here he had not been long before he was sent to an academy to be instructed in reading and writing, which he was extremely eager to attain, and most assiduous in learning. His temper was mild and compassionate in the highest degree; but it was at all times governed by discretion and judgment. If he saw the young asking relief, he would rebuke them with what little English he had, telling them it was a shame to beg when they were able to work; but the intreaties of old age he could never withstand, saying, "Must give poor old man, old man no able to work."

He always addressed Mr Wilson by the name of Captain, but never would call Mrs Wilson by any other name than mother, looking on that as a mark of the greatest respect; and such was the gratitude of his heart for the kindness they showed him, that if any of the family were ill, he always appeared unhappy, would creep softly up to the chamber, and sit silent by the bedside for a long time together without moving, peeping gently from time to time between the curtains, to see if they slept or lay still.

He was now proceeding with hasty strides in gaining the English language, writing, and accounts, when he was overtaken by that fatal disease, the small-pox, which the greatest pains had been taken to guard him against; and notwithstanding the utmost care and attention of his physician, he fell a victim to this scourge of the human race.

Upon this trying occasion, his spirit was above complaining, his thoughts being all engrossed by the kindness of his benefactors and friends. He told his attendant, that his father and mother would grieve very much, for they knew he was sick. This he repeated several times, "and begged him to go to Pelew, and tell Abba Thulle that Lee Boo take much drink to make small-pox go away, but he die; that the captain and

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and mother very kind; all English very good men; much sorry he could not speak to the king the number of fine things the English had got." Then he reckoned up the presents which had been given him, desiring that they might be properly distributed among the chiefs, and requesting that particular care might be taken of two glass pedestals, which he begged might be presented to his father.

We have given this short history of Lee Boo, because it exhibits in a strong light the manners of the natives of the Pelew islands, to which we know nothing similar in the history of man from the savage state to that of civilization. They appear to have had no communication with any other people, and were yet neither treacherous, cruel, nor cowardly. They are a striking instance of the weakness of all the philosophic theories by which mankind are usually traced from their origin through the several stages of savagism, barbarism, and civilization, down to the period of refinement, ending in effeminacy.

Since the publication of Captain Wilson's voyage we have some further accounts of these islands, all confirming what we were first told of the gentleness of the people. Two armed ships were, by order of the court of directors, fitted out at Bombay in 1790, for the purpose of surveying the islands of Pelew, and furnishing the natives with domestic animals, and such other things as might add to the comforts of life. Among the presents to the king were swords and other European implements of war; of which it is at least possible that he and his people might have been equally happy had they remained for ever in total ignorance. The foundation of a fort was likewise laid on one of the islands, and possession of it taken in the name of the English; we trust with no remote view of enslaving the people, or of driving them from their native country. It has been likewise announced in a late publication, that Captain M'Clue, who commanded the armed ships, was so delighted with the manners of the king and his subjects, that he has resolved to pass the remainder of his days on those islands at the early age of 34; and we hope he will prove a father to the people.

PELIAS (fab. hist.), twin-brother of Neleus, was son of Neptune by Tyro, daughter of Salmoneus. His birth was concealed by his mother, who wished her father to be ignorant of her incontinence. He was exposed in the woods, but his life was preserved by shepherds; and he received the name of *Pelias*, from a spot of the colour of *lead* in his face. Some time after Tyro married Cretheus, son of Æolus, king of Iolchos, and became mother of three children, of whom Æson was the eldest. Pelias visited his mother, and was received in her family; and after the death of Cretheus, he unjustly seized the kingdom, which belonged not to him, but to the children of Tyro by the deceased king. To strengthen himself in his usurpation, Pelias consulted the oracle; and when he was told to beware of one of the descendants of Æolus, who should come to his court with one foot shod and the other bare, he privately removed the son of Æson, after he had openly declared that he was dead. These precautions proved vain. Jason, the son of Æson, who had been educated by Chiron, returned to Iolchos, when come to years of maturity; and having lost one of his

shoes in crossing the river Anaurus or the Evenus, Pelias immediately perceived that this was the person whom he had so much dreaded. His unpopularity prevented him from acting with violence to a stranger, whose uncommon dress and commanding aspect had raised admiration in the people. But his astonishment was greatly excited, when he saw Jason arrive at his palace, with his friends and his relations, and boldly demand the kingdom which he had usurped. Pelias, conscious that his complaints were well founded, endeavoured to divert his attention, and told him that he would voluntarily resign the crown to him, if he went to Colchis to avenge the death of Phryxus, the son of Athamas, whom Æeres had cruelly murdered. He further declared, that the expedition would be attended with the greatest glory, and that nothing but the infirmities of old age had prevented himself from vindicating the honour of his country, and the injuries of his family, by punishing the assassin. This so warmly recommended, was with equal warmth accepted by the young hero, and his intended expedition was made known all over Greece. While Jason was absent in the Argonautic expedition, Pelias murdered Æson and all his family; but, according to the more received opinion of Ovid, Æson was still living when the Argonauts returned, and he was restored to the flower of youth by the magic of Medea. This change in the vigour and the constitution of Æson astonished all the inhabitants of Iolchos; and the daughters of Pelias, who have received the patronymic of Peliades, expressed their desire to see their father's infirmities vanish by the same powerful magic. Medea, who wished to avenge the injuries which her husband Jason had received from Pelias, raised the desires of the Peliades, by cutting an old ram to pieces, and boiling the flesh in a cauldron, and then turning it into a fine young lamb. After they had seen this successful experiment, the Peliades cut their father's body to pieces, after they had drawn all the blood from his veins, on the assurance that Medea would replenish them by her wonderful power. The limbs were immediately put into a cauldron of boiling water; but Medea suffered the flesh to be totally consumed, and refused to give the promised assistance, and the bones of Pelias did not even receive a burial. The Peliades were four in number, Alceste, Pisidice, Pelopea, and Hippothoe, to whom Hyginus adds Medusa. Their mother's name was Anaxibia, the daughter of Bias or Philomache, the daughter of Amphion. After this parricide, the Peliades fled to the court of Admetus, where Acastus, the son-in-law of Pelias, pursued them, and took their protector prisoner. The Peliades died, and were buried in Arcadia.

PELICAN, in ornithology. See PELICANUS.

PELICAN, in chemistry, is a glass alembic consisting of one piece. It has a tubulated capital, from which two opposite and crooked beaks pass out, and enter again at the belly of the cucurbit. This vessel has been contrived for a continued distillation and cohobation, which chemists call *circulation*. The volatile parts of substances put into this vessel rise into the capital, and are obliged to return through the crooked beaks into the cucurbit; and this without interruption, or luting and unluting the vessels.

Although the pelican seems to be a very convenient instru-

Pelias,
Pelican.

Pelicanus instrument, it is nevertheless little used, and even much neglected at present; either because the modern chemists have not so much patience as the ancient chemists had for making long experiments; or because they find that two matresses, the mouth of one of which is inserted into the mouth of the other, produce the same effect.

PELICANUS, in ornithology, a genus belonging to the order of anseres. The bill is straight, without teeth, and crooked at the point; the face is naked, and the feet are palmated. Mr Latham enumerates no less than 30 different species of this genus, besides varieties. The most remarkable seem to be these that follow:

1. The carbo, or corvorant, sometimes exceeds seven pounds in weight; the length three feet four; the extent four feet two; the bill dusky, five inches long, destitute of nostrils; the base of the lower mandible is covered with a naked yellow skin, that extends under the chin, and forms a sort of pouch; a loose skin of the same colour reaches from the upper mandible round the eyes and angles of the mouth; the head and neck are of a sooty blackness, but under the chin of the male the feathers are white; and the head in that sex is adorned with a short, loose, pendant crest; in some the crest and hind-part of the head are streaked with white. The coverts of the wings, the scapulars, and the back, are of a deep green, edged with black, and glossed with blue; the quill-feathers and tail dusky; the legs are short, strong, and black; the middle claw serrated on the inside; the irides are of a light ash-colour.

These birds occupy the highest parts of the cliffs that impend over the sea: they make their nests of sticks, sea-tang, grass, &c. and lay six or seven white eggs of an oblong form. In winter they disperse along the shores, and visit the fresh waters, where they make great havoc among the fish. They are remarkably voracious, having a most sudden digestion, promoted by the infinite quantity of small worms that fill their intestines. The corvorant has the rankest and most disagreeable smell of any bird, even when alive. Its form is disagreeable; its voice hoarse and croaking, and its qualities base. These birds, however, have been trained to fish like falcons to fowl. Whitelock tells us, that he had a cast of them manned like hawks, and which would come to hand. He took much pleasure in them; and relates, that the best he had was one presented him by Mr Wood, master of the corvorants to Charles I. It is well known that the Chinese make great use of these birds, or a congenious sort, in fishing; and that not for amusement, but profit.

2. The graculus, or shag, called in the north of England the *crane*, is much inferior in size to the corvorant: the length is 27 inches; the breadth three feet six; the weight three pounds three quarters. The bill is four inches long, and more slender than that of the preceding: the head is adorned with a crest two inches long, pointing backward; the whole plumage of the upper part of this bird is of a fine and very shining green; the edge of the feathers a purplish black; but the lower part of the back, the head, and neck, wholly green; the belly is dusky; the tail of a dusky

hue, tinged with green; the legs are black, and like those of the corvorant.

Both these kinds agree in their manners, and breed in the same places; and, what is very strange in web-footed birds, will perch and build in trees: both swim with their head quite erect, and are very difficult to be shot; for, like the grebes and divers, as soon as they see the flash of the gun, they pop under water, and never rise but at a considerable distance.

3. The bassanus, gannet, or solan goose, weighs seven pounds; the length is three feet one inch; the breadth six feet two inches. The bill is six inches long, straight almost to the point, where it inclines down; and the sides are irregularly jagged, that it may hold its prey with more security: about an inch from the base of the upper mandible is a sharp process pointing forward; it has no nostrils; but in their place a long furrow, that reaches almost to the end of the bill: the whole is of a dirty white, tinged with ash-colour. The tongue is very small, and placed low in the mouth; a naked skin of a fine blue surrounds the eyes, which are of a pale yellow, and are full of vivacity: this bird is remarkable for the quickness of its sight. Martin tells us, that *solan* is derived from an Irish word expressive of that quality.

From the corner of the mouth is a narrow slip of black bare skin, that extends to the hind part of the head; beneath the chin is another, that, like the pouch of the pelican, is dilatable, and of size sufficient to contain five or six entire herrings; which in the breeding season it carries at once to its mate or young.

The young birds, during the first year, differ greatly in colour from the old ones; being of a dusky hue; speckled with numerous triangular white spots; and at that time resemble in colours the speckled diver. Each bird, if left undisturbed, would only lay one egg in the year; but if that be taken away, they will lay another; if that is also taken, then a third; but never more that season. Their egg is white, and rather less than that of the common goose; the nest is large, and formed of any thing the bird finds floating on the water, such as grass, sea-plants, shavings, &c. These birds frequent the Isle of Alisa, in the Frith of Clyde; the rocks adjacent to St Kilda; the Stalks of Soulikerry, near the Orkneys; the Skelig Isles, off the coasts of Kerry, Ireland; and the Bass Isle, in the Frith of Edinburgh: the multitudes that inhabit these places are prodigious. Dr Harvey's elegant account of the latter, will serve to give some idea of the numbers of these, and of the other birds that annually migrate to that little spot.

"There is a small island, called by the Scotch *Bass Island*, not more than a mile in circumference; the surface is almost wholly covered during the months of May and June with nests, eggs, and young birds; so that it is scarcely possible to walk without treading on them; and the flocks of birds in flight are so prodigious as to darken the air like clouds; and their noise is such, that you cannot without difficulty hear your next neighbour's voice. If you look down upon the sea from the top of the precipice, you will see it on every side covered with infinite numbers of birds of different kinds, swimming and hunting for their prey:

Pelicanus. if in sailing round the island you survey the hanging cliffs, you may see in every cragg or fissure of the broken rocks innumerable birds of various sorts and sizes, more than the stars of heaven when viewed in a serene night: if from afar you see the distant flocks, either flying to or from the island, you would imagine them to be a vast swarm of bees."

Nor do the rocks of St Kilda seem to be less frequented by these birds; for Martin assures us, that the inhabitants of that small island consume annually no less than 22,600 young birds of this species, besides an amazing quantity of their eggs, these being their principal support throughout the year: they preserve both eggs and fowls in pyramidal stone-buildings, covering them with turf-ashes to preserve them from moisture. This is a dear-bought food, earned at the hazard of their lives, either by climbing the most difficult and narrow paths, where (to appearance) they can barely cling, and that too at an amazing height over the raging sea; or else, being lowered down from above, they collect their annual provision, thus hanging in midway air; placing their whole dependence on the uncertain footing of one person, who holds the rope by which they are suspended at the top of the precipice. The young birds are a favourite dish with the North Britons in general; during the season, they are constantly brought from the Bass Isle to Edinburgh, sold at 20d. a-piece, are roasted, and served up a little before dinner as a whet.

Mr Macaulay, missionary from the general assembly to St Kilda, gives the following account of them in that island: "These rocks are in summer totally covered with solan geese and other fowls, and appear at a distance like so many mountains covered with snow. The nests of the solan geese, not to mention those of other fowls, are so close, that when one walks between

them, the hatching fowls on either side can always take hold of one's cloths; and they will often sit until they are attacked, rather than expose their eggs to the danger of being destroyed by the sea-gulls; at the same time, an equal number fly about, and furnish food for their mates that are employed in hatching; and there are, besides, large flocks of barren fowls of the different tribes that frequent the rocks of St Kilda.

"The solan geese equal almost the tame ones in size. The common amusement of the herring-fishers show the great strength of this fowl. The fishers fix a herring upon a board which has a small weight under it, to sink it a little below the surface of the sea: the solan goose, observing the fish, darts down upon it perpendicularly, and with so much force, that he runs his bill irrecoverably through the board, and is taken up directly by the fishers.

"The solan geese repair to St Kilda in the month of March, and continue there till after the beginning of November. Before the middle of that month they, and all the other sea-fowls that are fond of this coast, retire much about the same time into some other favourite regions; so that not a single fowl belonging to their element is to be seen about St Kilda from the beginning of winter down to the middle of February. Before the young solan geese fly off, they are larger than their mothers, and the fat on their breasts is sometimes three inches deep. Into what quarter of the world these tribes of wild fowl repair, after winter sets in, whether into the northern ocean, the native country, and winter quarters of herrings in general, or into some other region near the sun, or whether they be of the sleeping kind, they who pry into the mysteries of natural history, or have conversed much with writers of voyages, can best explain (A). I shall only pretend to say, that these different nations of the feathered kind.

(A) The continuance of these birds is longer or shorter in the islands according as the inhabitants take or leave their first egg; but, in general, the time of breeding, and that of their departure, seems to coincide with the arrival of the herring, and the migration of that fish (which is their principal food) out of those seas. It is probable therefore that these birds attend the herring and pilchard during their whole circuit round the British islands; the appearance of the former being always esteemed by the fishermen as a sure presage of the approach of the latter. It migrates, we are told, in quest of food as far south as the mouth of the Tagus, being frequently seen off Lisbon during the month of September, or, as some say, December. Of the extensive migrations of this species we have the following more particular account in Pennant's Arctic Zoology: "It inhabits the coast of Newfoundland, where it breeds, and migrates southward as far as South Carolina. In Europe, it is common on the coast of Norway and Iceland; but as it never voluntarily flies over land, is not seen in the Baltic. It wanders for food as far as the coast of Lisbon and Gibraltar, where it has been seen in December, plunging for sardines. Straggles as high as Greenland. In northern Asia, it has been once seen by Steller off Bering's isle; but has been frequently met with in the southern hemisphere, in the Pacific Ocean; particularly in numbers about New Zealand and New Holland. Captain Cook also saw them in his passage from England to the Cape of Good Hope, and remoter from land than they had been seen elsewhere. Among those observed in the South Sea, is the variety called *fula*, with a few black feathers in the tail and among the secondaries. They are found not only on the Feroe islands, but on our coasts, one having been brought to me a few years ago which had fallen down wearied with its flight." In the month of August, the same accurate naturalist has observed in Caithness their northern migrations: he has seen them passing the whole day in flocks, from five to fifteen in each: in calm weather they fly high; in storms they fly low, and near the shore; but never cross over the land; even when a bay with promontories intervenes, but follow, at an equal distance, the course of the bay, and regularly double every cape. Many of the parties made a sort of halt for the sake of fishing: they soared to a vast height, then darting headlong into the sea, made the water foam and spring up with the violence of their descent, after which they pursued their route. Our author inquired whether they ever were observed to return southward in the spring, but was answered in the negative; so it appears that they annually encircle the whole island.

Pelicanus kind are taught to choose the properest habitations and feeding places, and to shift their quarters seasonably, by the unerring hand of God.

"From the account given above of the multitudes of sea-fowls that seek their food on this coast, we may justly conclude that there must be inexhaustible stores of fish there. Let us for a moment confine our attention to the consumption made by a single species of fowls. The solan goose is almost insatiably voracious; he flies with great force and velocity, toils all the day with very little intermission, and digests his food in a very short time; he disdains to eat any thing worse than herring or mackarel, unless it be in a very hungry place, which he takes care to avoid or abandon. We shall take it for granted that there are 100,000 of that kind around the rocks of St Kilda; and this calculation is by far too moderate, as no less than 20,000 of this kind are destroyed every year, including the young ones. We shall suppose, at the same time, that the solan geese sojourn in these seas for about seven months of the year; that each of them destroys five herrings in a day; a subsistence infinitely poor for so greedy a creature, unless it were more than half supported at the expence of other fishes. Here we have 100,000,000 of the finest fish in the world devoured annually by a single species of the St Kilda sea-fowls.

"If, in the next place, it be considered, that much the greatest part of the other tribes have much the same appetite for herring, and pursue it from place to place, in the several migrations it makes from one sea to another, the consumption must be prodigiously great. Taking these into the account, and allowing them the same quantity of food, and of the same kind, by reason of their vast superiority in point of numbers, tho' their stomachs are considerably weaker; we see there are no less than 200,000,000 of herrings swallowed up every year by the birds of a very small district of rocks, which occupy so inconsiderable a space in the Deucalionian ocean.

"Should all the articles of this account be sustained, articles which seem no less just than plain, and should our curiosity lead us into a new calculation, allowing between 600 and 700 to every barrel, it is evident that more than 330,000 barrels are annually carried away by such creatures."

These birds are well known on most of the coasts of England, but not by the name of the *Solan goose*. In Cornwall and in Ireland they are called *gannets*; by the Welsh, *gan*. Mr Ray supposed the Cornish gannet to be a species of large gull: a very excusable mistake; for during his six months residence in Cornwall, he never had an opportunity of seeing that bird, except flying; and in the air it has the appearance of a gull. On that supposition he gave our skua the title of *cataraeta*, a name borrowed from Aristotle, and which admirably expresses the rapid descent of this bird on its prey. Mr Moyle first detected this mistake; and the Rev. Dr William Borlase, by presenting us with a fine specimen of this bird, confirms the opinion of Mr Moyle; at the same time giving the following natural history of the bird.

"The gannet comes on the coasts of Cornwall in the latter end of summer, or beginning of autumn; hovering over the shoals of pilchards that come down

to us through St George's Channel from the northern sea. The gannet seldom comes near the land, but is constant to its prey, a sure sign to the fishermen that the pilchards are on the coasts; and when the pilchards retire, generally about the end of November, the gannets are seen no more. The bird now sent was killed at Chandour, near Mountsbay, Sept. 30. 1762, after a long struggle with a water-spaniel, assisted by the boatmen; for it was strong and pugnacious. The person who took it observed that it had a transparent membrane under the eye-lid, with which it covered at pleasure the whole eye, without obscuring the sight or shutting the eye-lid; a gracious provision for the security of the eyes of so weighty a creature, whose method of taking its prey is by darting headlong on it from a height of 150 feet or more into the water. About four years ago, one of these birds flying over Penzance, (a thing that rarely happens), and seeing some pilchards lie on a fir-plank, in a cellar used for curing fish, darted itself down with such violence, that it struck its bill quite through the board (about an inch and a quarter thick), and broke its neck."

These birds are sometimes taken at sea by a deception of the like kind; the fishermen fastening a pilchard to a board, as in St Kilda they fasten herrings, and which in the same manner decoys the unwary gannet to its own destruction.

In the *Cataraeta* of Juba may be found many characters of this bird: he says, that the bill is toothed; that its eyes are fiery; and that its colour is white: and in the very name is expressed its furious descent on its prey. The rest of his accounts favour of fable. — We are uncertain whether the gannet breeds in any other parts of Europe besides our own islands; except, as Mr Ray suspects, the fula (described in Clusius's *Exotics*, which breeds in Feroe Isles) be the same bird.

4. The fula, or booby, is somewhat less than a goose; the basis of the bill yellow, and of bare feathers; the eyes of a light-grey colour; the lower part of the bill of a light brown. The colours of the body are brown and white; but varied so in different individuals, that they cannot be described by them. Their wings are very long; their legs and feet pale yellow, shaped like those of corvorants. They frequent the Bahama islands, where they breed all months in the year, laying one, two, or three eggs, on the bare rock. While young, they are covered with a white down, and continue so till they are almost ready to fly. They feed on fish like the rest of this genus; but have a very troublesome enemy of the man-of-war bird, which lives on the spoils obtained from other sea-birds, particularly the booby. As soon as this rapacious enemy perceives that the booby has taken a fish, he flies furiously at him, upon which the former dives to avoid the blow; but as he cannot swallow his prey below water, he is soon obliged to come up again with the fish in his bill as before, when he suffers a new assault; nor does his enemy cease to persecute him till he lets go the fish, which the other immediately carries off.

5. The great booby, called by Linnæus *pelicanus* *Balsani pufus*, frequents the rivers and sea-coasts of Florida, pursuing and devouring fishes like others of the genus. Mr Catesby informs us, that he has se-

veral

Pelicanus. veral times found them disabled, and sometimes dead, on the shore; whence he thinks that they meet with sharks or other voracious fishes, which destroy them. The bird is about the size of a goose; the head and neck remarkably prominent; the back of a brown colour; the belly dusky white; the feet black, and shaped like those of a corvorant; the head elegantly spotted with white; the wings extend six feet when spread. Both this species and the last have a joint in the upper mandible of the bill, by which they can raise it considerably from the lower one without opening the mouth.

Latham's
Synopsis of
Birds.

6. The aquilus, or man-of-war bird, is in the body about the size of a large fowl; in length three feet, and in breadth 14. The bill is slender, five inches long, and much curved at the point; the colour is dusky; from the base a reddish dark-coloured skin spreads on each side of the head, taking in the eyes: from the under mandible hangs a large membranaceous bag attached some way down the throat, as in the pelican, and applied to the same uses; the colour of this is a fine deep red, sprinkled on the sides with a few scattered feathers: the whole plumage is brownish-black, except the wing coverts, which have a rufous tinge: the tail is long, and much forked; the outer feathers are 18 inches or more in length; the middle ones from seven to eight: the legs are small, all the toes are webbed together, and the webs are deeply indented; the colour of them is dusky red.

The female differs in wanting the membranaceous pouch under the chin; and in having the belly white: in other things is greatly like the male.

The frigate pelican, or man-of-war bird (B), as it is by some called, is chiefly, if not wholly, met with between the tropics, and ever out at sea, being only seen on the wing. It is usual with other birds, when fatigued with flying, to rest themselves on the surface of the water; but nature, from the exceeding length of wing ordained to this, has made the rising therefrom utterly impossible, at least writers not only so inform us, but every one whom we have talked with avers the same; though perhaps this is no defect of nature, as it scarcely seems to require much rest; at least, from the length of wing, and its apparent easy gliding motion (much like that of the kite), it appears capable of sustaining very long flights; for it is often seen above 100, and not unfrequently above 200, leagues from land. It has indeed been known to settle on the masts of ships; but this is not a frequent circumstance, though it will often approach near, and hover about the top-mast flag. Sometimes it soars so high in the air as to be scarcely visible, yet at other times approaches the surface of the sea, where, hovering at some distance, the moment he spies a fish, it darts down on it with the utmost rapidity, and seldom without success, flying upwards again as quick as it descended. It is also seen to attack* gulls and other

birds which have caught a fish, when it obliges them to disgorge it, and then take care to seize it before it falls into the water. It is an enemy to the flying-fish; for, on their being attacked beneath by the dolphin and other voracious fish, to escape their jaws, these semi-volatiles leap out of the water in clusters, making use of their long fins as wings to buoy them up in the air, which they are enabled to do so long as they remain wet; but the moment they become dry are useless, and drop into their proper element again: during their flight, the frigate darts in among the shoal, and seizes one or two at least. These birds know the exact place where the fish are to rise from the bubbling of the water, which directs them to the spot; in this they are accompanied by gulls and other birds, who act in concert with them.

These birds, which, though not uncommon everywhere within the tropics, yet are less frequent in some places than others, were seen by Cook in 30½ deg. In the old route of navigators, they are mentioned frequently as being met with at Ascension Island, Ceylon, East Indies, and China(c). Dampier saw them in great plenty in the island of Aves in the West Indies. Our later navigators talk of them as frequenting various places of the South Sea, about the Marquesas, Easter Isles, and New Caledonia, also at Otaheitee, though at this last place not in such plenty as in many others. They are said to make nests on trees, if there be any within a proper distance; otherwise on the rocks. They lay one or two eggs of a flesh-colour, marked with crimson spots. The young birds are covered with greyish white down: the legs are of the same colour, and the bill is white. There is a variety of this species, which is less, measuring only two feet nine inches in length: the extent from wing to wing is five feet and a half. The bill is five inches long, and red; the base of it, and bare space round the eye, are of the same colour; the nostrils are sufficiently apparent, and appear near the base; the shape of the bill is as in the larger one: the head, hind part of the neck, and upper parts of the body and wings, are ferruginous brown; the throat, fore part of the neck, and breast, are white; the tail is greatly forked as in the other; the legs are of a dirty yellow.

"In my collection (says Latham) is a bird very similar to this, if not the same: general colour of the plumage full black; breast and belly mottled with ash-colour; the inner ridge of the wing the same; the bill has the long furrow, as is seen in the greater one; but the nostrils are sufficiently apparent, being about half an inch in length, rather broader at that part near the base. This has a large red pouch at the chin and throat, as in the former species. It is most likely that mine is the male bird, as others, suspected to be of the opposite sex, have little or no traces of the jugular pouch. This supposition seems justified from a pair in the Hunterian museum, in both of which the plumage is wholly black; the one has a large pouch, the other

* See the account of the fula or booby species above.

(B) It is also called *tailleur*, or tailor, by the French, from the motion of its tail representing a pair of shears when opened; and when on the wing, it opens and shuts them frequently, in the manner of using that instrument.—*Ulloa, Voy. ii. p. 304.*

(c) Thought by Osbeck to be one of the sorts of birds used in fishing by the Chinese.

Pelicanus. other destitute of it. Some have supposed that the greater and lesser frigates are the same bird, in different periods of age."

7. The onocrotalus, or pelican of Asia, Africa, and America; though Linnæus thinks that the pelican of America may possibly be a distinct variety. This creature, in Africa, is much larger in the body than a swan, and somewhat of the same shape and colour. Its four toes are all webbed together; and its neck in some measure resembles that of a swan: but that singularity in which it differs from all other birds is in the bill and the great pouch underneath. This enormous bill is 15 inches from the point to the opening of the mouth, which is a good way back behind the eyes. At the base the bill is somewhat greenish, but varies towards the end, being of a reddish blue. It is very thick in the beginning, but tapers off to the end, where it hooks downwards. The under-chap is still more extraordinary; for to the lower edges of it hang a bag, reaching the whole length of the bill to the neck, which is said to be capable of containing 15 quarts of water. This bag the bird has a power of wrinkling up into the hollow of the under-chap; but by opening the bill, and putting one's hand down into the bag, it may be distended at pleasure. The skin of which it is formed will then be seen of a bluish ash colour, with many fibres and veins running over its surface. It is not covered with feathers, but with a short downy substance as smooth and as soft as satin, and is attached all along to the under edges of the chap, is fixed backward to the neck of the bird by proper ligaments, and reaches near half way down. When this bag is empty, it is not seen; but when the bird has fished with success, it is then incredible to what an extent it is often seen dilated. For the first thing the pelican does in fishing is to fill up the bag; and then it returns to digest its burden at leisure. When the bill is opened to its widest extent, a person may run his head into the bird's mouth, and conceal it in this monstrous pouch, thus adapted for very singular purposes. Yet this is nothing to what Ruysch assures us, who avers that a man has been seen to hide his whole leg, boot and all, in the monstrous jaws of one of these animals. At first appearance this would seem impossible, as the sides of the under chap, from which the bag depends, are not above an inch asunder when the bird's bill is first opened; but then they are capable of great separation; and it must necessarily be so, as the bird preys upon large fishes, and hides them by dozens in its pouch. Tertre affirms, that it will hide as many fish as will serve 60 hungry men for a meal.

This pelican was once also known in Europe, particularly in Russia; but it seems to have deserted our coasts. This is the bird of which so many fabulous accounts have been propagated; such as its feeding its young with its own blood, and its carrying a provision of water for them in its great reservoir in the desert. But the absurdity of the first account answers itself; and as for the latter, the pelican uses its bag for very different purposes than that of filling it with water.

Clavigero, in his History of Mexico, says that "there are two species, or rather varieties, of this bird in Mexico; the one having a smooth bill, the other a notched one. Although the Europeans are acquainted with this bird, I do not know whether they are

equally well acquainted with the singular circumstance of its assisting the sick or hurt of its own species; a circumstance which the Americans sometimes take advantage of to procure fish without trouble. They take a live pelican, break its wing, and after tying it to a tree, conceal themselves in the neighbourhood; there they watch the coming of the other pelicans with their provisions, and as soon as they see these throw up the fish from their pouch, run in, and after leaving a little for the captive bird, they carry off the rest."

This amazing pouch may be considered as analogous to the crop in other birds; with this difference, that as theirs lie at the bottom of the gullet, so this is placed at the top. Thus, as pigeons and other birds macerate their food for their young in their crops, and then supply them; so the pelican supplies its young by a more ready contrivance, and macerates their food in its bill, or stores it for its own particular sustenance.

The ancients were particularly fond of giving this bird admirable qualities and parental affections: struck, perhaps, with its extraordinary figure, they were willing to supply it with as extraordinary appetites; and having found it with a large reservoir, they were pleased with turning it to the most tender and parental uses. But the truth is, the pelican is a very heavy, sluggish, voracious bird, and very ill fitted to take those flights, or to make those cautious provisions for a distant time, which we have been told they do.

The pelican, says Labat, has strong wings, furnished with thick plumage of an ash-colour, as are the rest of the feathers over the whole body. Its eyes are very small, when compared with the size of its head; there is a sadness in its countenance, and its whole air is melancholy. It is as dull and reluctant in its motions as the flamingo is sprightly and active. It is slow of flight; and when it rises to fly, performs it with difficulty and labour. Nothing, as it would seem, but the spur of necessity, could make these birds change their situation, or induce them to ascend into the air: but they must either starve or fly.

They are torpid and inactive to the last degree, so that nothing can exceed their indolence but their gluttony; it is only from the stimulations of hunger that they are excited to labour; for otherwise they would continue always in fixed repose. When they have raised themselves about 30 or 40 feet above the surface of the sea, they turn their head with one eye downwards, and continue to fly in that posture. As soon as they perceive a fish sufficiently near the surface, they dart down upon it with the swiftness of an arrow, seize it with unerring certainty, and store it up in their pouch. They then rise again, though not without great labour, and continue hovering and fishing, with their head on one side as before.

This work they continue with great effort and industry till their bag is full, and then they fly to land to devour and digest at leisure the fruits of their industry. This, however, it would appear, they are not long in performing; for towards night they have another hungry call, and they again reluctantly go to labour. At night, when their fishing is over, and the toil of the day crowned with success, these lazy birds retire a little way from the shore; and, though with the webbed feet and clumsy figure of a goose, they will be contented to perch nowhere but upon trees among the light and airy

Pelicanus airy tenants of the forest. There they take their repose for the night; and often spend a great part of the day, except such times as they are fishing, sitting in dismal solemnity, and, as it would seem, half asleep. Their attitude is with the head resting upon their great bag, and that resting upon their breast. There they remain without motion, or once changing their situation, till the calls of hunger break their repose, and till they find it indispensably necessary to fill their magazine for a fresh meal. Thus their life is spent between sleeping and eating; and our author adds, that they are as foul as they are voracious, as they are every moment voiding excrements in heaps as large as one's fist.

The same indolent habits seem to attend them even in preparing for incubation, and defending their young when excluded. The female makes no preparation for her nest, nor seems to choose any place in preference to lay in; but drops her eggs on the bare ground, to the number of five or six, and there continues to hatch them. Attached to the place, without any desire of defending her eggs or her young, she tamely sits and suffers them to be taken from under her. Now and then she just ventures to peck, or to cry out when a person offers to beat her off.

She feeds her young with fish macerated for some time in her bag; and when they cry, flies off for a new supply. Labat tells us, that he took two of these when very young, and tied them by the leg to a post stuck into the ground, where he had the pleasure of seeing the old one for several days come to feed them, remaining with them the greatest part of the day, and spending the night on the branch of a tree that hung over them. By these means they were all three become so familiar, that they suffered themselves to be handled; and the young ones very kindly accepted whatever fish he offered them. These they always put first into their bag, and then swallowed at their leisure.

It seems, however, that they are but disagreeable and useless domesticks; their gluttony can scarcely be satisfied; their flesh smells very rancid, and tastes a thousand times worse than it smells. The native Americans kill vast numbers; not to eat, for they are not fit even for the banquet of a savage, but to convert their large bags into purses and tobacco-pouches. They bestow no small pains in dressing the skin with salt and ashes, rubbing it well with oil, and then forming it to their purpose. It thus becomes so soft and pliant, that the Spanish women sometimes adorn it with gold and embroidery to make work-bags of.

Yet, with all the seeming hebetude of this bird, it is not entirely incapable of instruction in a domestic state. Father Raymond assures us, that he has seen one so tame and well educated among the native Americans, that it would go off in the morning at the word of command, and return before night to its master, with its great pouch distended with plunder: a part of which the savages would make it disgorge, and a part they would permit it to reserve for itself.

"The pelican," as Faber relates, "is not destitute of other qualifications. One of those which was brought alive to the duke of Bavaria's court, where it lived 40 years, seemed to be possessed of very uncommon sensations. It was much delighted in the com-

pany and conversation of men, and in music both vocal and instrumental; for it would willingly stand," says he, "by those that sung or sounded the trumpet; and stretching out its head, and turning its ear to the music, listened very attentively to its harmony, though its own voice was little pleasanter than the braying of an ass." Gesner tells us, that the emperor Maximilian had a tame pelican which lived for above 80 years, and that always attended his army on their march. It was one of the largest of the kind, and had a daily allowance by the emperor's orders. As another proof of the great age to which the pelican lives, Aldrovandus makes mention of one of these birds that was kept several years at Mechlin, and was verily believed to be 50 years old.—We often see these birds at our shews about town.

Mr Edwards, in his History of Birds, describes the pelican of America from one, the body of which was sent him stuffed and dried. From the point of the bill to the angles of the mouth measured 13 inches, and the wing when closed measured 18 inches. The pouch when dry appeared of the consistence and colour of a brown dry ox's bladder, having fibres running its whole length, and blood-vessels crossing them; and proceeding from the sides of the lower part of the bill, which opened into this pouch, its whole length. The greater bone of the wing being broken, was found to be light, hollow, void of marrow, and the sides of it thin as parchment. Sir Hans Sloane writes thus of it (see *Nat. Hist. of Jamaica*, vol. ii. p. 322.): "This seems to be the same with the white pelican, only of a darker colour. They are frequent in all the seas of the hot West Indies. They fish after the same manner as man-of-war birds, and come into the sheltered bays in stormy weather, where they very often perch on trees: they fly over the sea as gulls, and take the fish when they spy them, by falling down upon them, and they then rise again and do the like. They are not reckoned good food. When they are seen at sea, it is a sign of being near land." Wafer, in his voyage and description of the isthmus of America, says, "The pelican is not found on the South Sea side of the isthmus, but they abound on the northern side: They are of a dark grey colour, and under the throat hangs a bag: the old ones are not eaten, but the young are good meat." Mr Edwards, in another place, gives the description of a pelican, which he says is double the bigness of the largest swan. His drawing was made from the pelican shown at London in 1745, which was brought by Capt. Pelly from the Cape of Good Hope, where they are larger than anywhere else. The body, legs, and feet, very much resemble the pelican of America; and it differs little but in the head and neck, which last is very long, like a swan's; the bill is straighter, and the upper part only hooked at the end; the pouch is shaped something different, hanging more down in the middle. Mr Edwards thus describes it. "From the point of the bill to the angle of the mouth is 20 inches of our English measure, which is six inches more than any natural historian has found it; the academy of Paris having measured one which was about 14 inches, Paris measure I suppose; and our countryman, Willoughby, measured one brought from Russia, which he makes 14 inches English. I thought it something incredible in Willoughby's description, that a man should

Pelican should put his head into the pouch under the bill, till I saw it performed in this bird by its keeper, and am sure a second man's head might have been put in with it at the same time."

The Academy of Paris think the bird they have described is the pelican of Aristotle, and the Onocrotalus of Pliny. They are also confirmed in the opinion that this is a long-lived bird; for, out of a great number kept at Versailles, none had died for more than 12 years, being the only animals kept in the menagery of which some have not died in that time. Some authors say they live 60 or 70 years.

Capt. Keeling, in his voyage to Sierra Leona, says the pelicans there are as large as swans, of a white colour, with exceeding long bills; and M. Thevenot, in his travels to the Levant, observes, that the pelicans about some part of the Nile near the Red Sea swim by the bank side like geese, in such great numbers that they cannot be counted. Father Morolla, in his voyage to Congo, says pelicans are often met with in the road to Singa, and are all over black, except on their breast, which is of a flesh colour like the neck of a turkey. He adds further, that father Francis de Pavia informed him, that on his journey to Singa he observed certain large white birds, with long beaks, necks, and feet, which, whenever they heard the least sound of an instrument, began immediately to dance, and leap about the rivers, where they always reside, and whereof they were great lovers: this, he said, he took a great pleasure to contemplate, and continued often upon the banks of the rivers to observe.

It would extend our article beyond all proportion, were we to touch on each individual species of this extensive genus, together with their accidental varieties. But as the genus is unquestionably very curious, we shall here subjoin a list of books, which such of our readers as desire it may have recourse to for further information: *Edward's History of Birds*; *Natural History of Jamaica*; *Mem. de l'Academie Royale des Sciences, depuis 1666 jusqu'à 1699*, tom. 3. troisième partie, p. 186.; *Willoughby*; *Pennant's British and Arctic Zoology*; and *Latham's Synopsis of Birds*; the last of which is the fullest and most scientific of any we have yet seen.

PELION (Diodorus Siculus, &c.), *Pelios*, mons understood, (Mela, Virgil, Horace, Seneca), a mountain of Thessaly near Ossa, and hanging over the Sinus Pelasgicus, or Pegasicus; its top covered with pines, the sides with oaks, (Ovid). Said also to abound in wild ash, (Val. Flaccus). From this mountain was cut the spear of Achilles, called *pelias*, which none but himself could wield, (Homer). Dicearchus, Aristotle's scholar, found this mountain 1250 paces higher than any other of Thessaly, (Pliny). *Pelios*, Cicero; *Pelias*, (Catullus), the epithet.

PELLA (anc. geog.), a town situated on the confines of Emathia, a district of Macedonia, (Ptolemy); and therefore Herodotus allots it to Bottiæa, a maritime district on the Sinus Thermaicus. It was the royal residence, situated on an eminence, verging to the south-west, encompassed with unpassable marshes summer and winter: in which, next the town, a citadel like an island rises, placed on a bank or dam, a prodigious work, both supporting the wall and securing it from any hurt by means of the circumfluent water. At a

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distance, it seems close to the town, but is separated from it by the Ludias, running by the walls, and joined to it by a bridge, (Livy): distant from the sea 120 stadia, the Ludias being so far navigable, (Strabo). Mela calls the town *Pelle*, though most Greek authors write *Pella*. The birth-place of Philip, who enlarged it; and afterwards of Alexander, (Strabo, Mela). Continued to be the royal residence down to Perseus, (Livy). Called *Pella Colonia*, (Pliny); *Colonia Julia Augusta*, (Coin). It afterwards came to decline, with but few and mean inhabitants, (Lucian). It is now called τα Παλαίσια, the *Little Palace*, (Hollstenius). *Pellæus*, both the gentilitious name and the epithet, (Lucian, Juvenal, Martial).—Another **PELLA**, (Polybius, Pliny); a town of the Decapolis, on the other side the Jordan; abounding in water, like its cognominal town in Macedonia; built by the Macedonians, (Strabo); by Seleucus, (Eusebius); anciently called *Butis*, (Stephanus); *Apamea*, (Strabo); situated 35 miles to the north-east of Gerasa, (Ptolemy). Thither the Christians, just before the siege of Jerusalem by Titus, were divinely admonished to fly, (Eusebius). It was the utmost boundary of the Peræa, or Transjordan country, to the north, (Josephus).

PELLETIER (James), a doctor of physic, and an eminent mathematician, was born at Mans in 1517, and died at Paris in 1582. He was an excellent Latin and French poet, a good orator, physician, and grammarian. He wrote *Oeuvres Poétiques, Commentaires Latins sur Euclide, &c.*

PELLETS, in heraldry, those roundles that are black; called also *ogresses* and *gunstones*, and by the French *torteaux de sable*.

PELLICLE, among physicians, denotes a thin film or fragment of a membrane. Among chemists it signifies a thin surface of crystals uniformly spread over a saline liquor evaporated to a certain degree.

PELLISON, or **PELLISON FONTANIER**, (Paul), one of the finest geniuses of the 17th century, was the son of James Pellison counsellor at Castres. He was born at Beziers in 1624, and educated in the Protestant religion. He studied with success the Latin, Greek, French, Spanish, and Italian tongues, and applied himself to the reading the best authors in these languages; after which he studied the law at Castres with reputation. In 1652 he purchased the post of secretary to the king, and five years after became first deputy to M. Fouquet. He suffered by the disgrace of that minister; and in 1661 was confined in the Bastille, from whence he was not discharged till four years after. During his confinement he applied himself to the study of controversy; and in 1670 abjured the Protestant religion. Louis XIV. bestowed upon him an annual pension of 2000 crowns; and he likewise enjoyed several posts. In 1676 he had the abbey of Giment, and some years after the priory of St Orens at Auch. He died in 1693. His principal works are, 1. The History of the French Academy. 2. Reflections on religious Disputes, &c. in 4 vols 12mo. 3. The History of Louis XIV. 5. Historical Letters and Miscellanies, in 3 vols 12mo.

PELOPIA, a festival observed by the Eleans in honour of Pelops. A ram was sacrificed on the occasion, which both priests and people were prohibited

P

from

Pelletier
||
Pelopida.

Pelopon-
nesus
||
Pelusium.

from partaking of, on pain of excommunication from Jupiter's temple: the neck only was allotted to the officer who provided wood for the sacrifice. This officer was called *Ξυλῆς*; and white poplar was the only wood made use of at this solemnity.

PELOPONNESUS, (Dionysius), a large peninsula to the south of the rest of Greece; called, as it were, *Pelopsis nefus* or *insula*, though properly not an island, but a peninsula; yet wanting but little to be one, viz. the isthmus of Corinth, ending in a point like the leaf of the platane or plane-tree. Anciently called *Apia* and *Pelafgia*; a peninsula second to no other country for nobleness; situated between two seas, the Egean and Ionian, and resembling a platane-leaf, on account of its angular recesses or bays, (Pliny, Strabo, Mela). Strabo adds from Homer, that one of its ancient names was *Argos*, with the epithet *Achaicum*, to distinguish it from Thessaly, called *Pelafgicum*. Divided into six parts; namely, Argolis, Laconica, Messenia, Elis, Achaia, and Arcadia, (Mela). Now called the *Morea*.

PELOPS, in fabulous history, the son of Tantalus king of Phrygia, went into Elis, where he married Hippodamia the daughter of Oenomaus king of that country; and became so powerful, that all the territory which lies beyond the Isthmus, and composes a considerable part of Greece, was called *Peloponnesus*, that is, the *island of Pelops*, from his name and the word *Νῆσος*.

PELTA, a small, light, manageable buckler, used by the ancients. It was worn by the Amazons. The pelta is said by some to have resembled an ivy leaf in form; by others it is compared to the leaf of an Indian fig-tree; and by Servius to the moon in her first quarter.

PELTARIA, in botany: A genus of the filiculosa order, belonging to the tetradynamia class of plants; and in the natural method ranking under the 39th order, *Siliquosa*. The filicula is entire, and nearly orbiculated, compressed-plane, and not opening.

PELUSIUM (anc. geog.), a noble and strong city of Egypt, without the Delta, distant 20 stadia from the sea; situated amidst marshes; and hence its name and its strength. Called the *key* or *inlet of Egypt* (Diodorus, Hirtius); which being taken, the rest of Egypt lay quite open and exposed to an enemy. Called *Sin* (Ezekiel). *Pelusiacus* the epithet (Virgil, Diodorus). From its ruins arose Damietta. E. Long. 32°. N. Lat. 31°.

Letters on
Egypt.

Mr Savary gives us the following account of this place: "The period of its foundation, as well as that of the other ancient cities of Egypt, is lost in the obscurity of time. It flourished long before Herodotus. As it commanded the entrance of the country on the side of Asia, the Pharaohs rendered it a considerable fortress: one of them raised a rampart of 30 leagues in length from the walls of this town to Heliopolis. But we find from the history of nations that the long wall of China, those which the weakness of the Greek emperors led them to build round Constantinople, and many others, built at an immense expence, were but feeble barriers against a warlike people: these examples have taught us, that a state, to be in security against a foreign yoke, must form warriors within itself, and that men must be opposed to men. This rampart,

which covered Pelusium, did not stop Cambyfes, who attacked it with a formidable army. The feeble character of the son of Amasis, unable to prevent the desertion of 200,000 Egyptians, who went to found a colony beyond the cataracts, had not force sufficient to oppose that torrent which broke in upon his country. Cambyfes, after a bloody battle, wherein he cut his enemies to pieces, entered Pelusium in triumph. That memorable day, which saw the desertion of one part of the Egyptian militia and the ruin of the other, is the true epoch of the subjugation of that rich country. Since that period, it has passed under the yoke of the Persians, the Macedonians, the Romans, the Greeks, the Arabs, and the Turks. A continued slavery of more than 2000 years seems to secure them an eternal bondage.

"Herodotus, who visited Pelusium some years after the conquest of Cambyfes, relates an anecdote which I cannot omit: 'I surveyed (says he) the plain where the two armies had fought. It was covered with human bones collected in heaps. Those of the Persians were on one side, those of the Egyptians on the other, the inhabitants of the country having taken care to separate them after the battle. They made me take notice of a fact which would have appeared very astonishing to me without their explanation of it. The skulls of the Persians, which were slight and fragile, broke on being lightly struck with a stone; those of the Egyptians, thicker and more compact, resisted the blows of flint. This difference of solidity they attributed to the custom the Persians have of covering their heads from their infancy with the tiara, and to the Egyptian custom of leaving the heads of their children bare and shaved, exposed to the heat of the sun. This explanation appeared satisfactory to me.' Mr Savary assures us that the same customs still subsist in Egypt, of which he frequently had ocular demonstration.

"Pelusium (continues he), after passing under the dominion of Persia, was taken by Alexander. The brave Antony, general of cavalry under Gabinus, took it from his successors, and Rome restored it to Ptolemy Auletes. Pompey, whose credit had established this young prince on the throne of Egypt, after the fatal battle of Pharsalia took refuge at Pelusium. He landed at the entrance of the harbour; and on quitting his wife Cornelia and his son, he repeated the two following verses of Sophocles, 'The free man who seeks an asylum at the court of a king will meet with slavery and chains.' He there found death. Scarcely had he landed on the shore, when Theodore the rhetorician, of the isle of Chio, Septimius the courtier, and Achilles the eunuch, who commanded his troops, wishing for a victim to present to his conqueror, stabbed him with their swords. At the sight of the assassins Pompey covered his face with his mantle, and died like a Roman. They cut off his head, and embalmed it, to offer it to Cæsar, and left his body naked on the shore. It was thus that this great man, whose warlike talents had procured the liberty of the seas for the Romans, and added whole kingdoms to their extended empire, was basely slain in setting foot on the territory of a king who owed to him his crown. Philip his freedman, collecting together, under favour of the night, the wreck of a boat, and stripping off his own cloak to cover the sad remains of his master, burnt them

Pelvis
||
Pembroke-
shire.

them according to the custom. An old soldier, who had served under Pompey's colours, came to mingle his tears with those of Philip, and to assist him in performing the last offices to the manes of his general.—Pelusium was often taken and pillaged during the wars of the Romans, the Greeks, and the Arabs. But in spite of so many disasters, she preserved to the time of the Crusades her riches and her commerce. The Christian princes having taken it by storm, sacked it. It never again rose from its ruins; and the inhabitants went to Damietta." See DAMIETTA.

PELVIS, in anatomy. See there, n° 3—43.

PEMBROKE (Mary Countess of). See HERBERT.

PEMBROKE, in Pembrokeshire, in England, is the principal town in the county. It is situated upon a creek of Milford-Haven, and in the most pleasant part of Wales, being about 256 miles distant from London. It is the county-town, and has two handsome bridges over two small rivers which run into a creek, forming the west side of a promontory. It is well inhabited, has several good houses, and but one church. There is also a custom-house in it. There are several merchants in it, who, favoured by its situation, employ near 200 sail on their own account; so that, next to Caermarthen, it is the largest and richest town in South Wales. It has one long straight street, upon a narrow part of a rock; and the two rivers seem to be two arms of Milford-Haven, which ebbs and flows close up to the town. It is governed by a mayor, bailiffs, and burgesses; and was in former times fortified with walls, and a magnificent castle seated on a rock at the west end of the town. In this rock, under the chapel, is a natural cavern called *Wogan*, remarked for having a very fine echo: this is supposed to have been a store-room for the garrison, as there is a staircase leading into it from the castle: it has also a wide mouth towards the river. This structure being burnt a few years after it was erected, it was rebuilt. It is remarkable for being the birth-place of Henry VII. and for the brave defence made by the garrison for Charles I.

PEMBROKESHIRE, a county of Wales, bounded on all sides by the Irish sea, except on the east, where it joins to Caermarthenshire, and on the north-east to Cardiganshire. It lies the nearest to Ireland of any county in Wales; and extends in length from north to south 35 miles, and from east to west 29, and is about 140 in circumference. It is divided into seven hundreds, contains about 420,000 acres, one city, eight market-towns, two forests, 145 parishes, about 2300 houses, and 25,900 inhabitants. It lies in the province of Canterbury, and diocese of St David's. It sends three members to parliament, viz. one for the shire, one for Haverfordwest, and one for the town of Pembroke.

The air of Pembrokeshire, considering its situation, is good; but it is in general better the farther from the sea. As there are but few mountains, the soil is generally fruitful, especially on the sea-coasts; nor are its mountains altogether unprofitable, but produce pasture sufficient to maintain great numbers of sheep and goats. Its other commodities are corn, cattle, pit-coal, marl, fish, and fowl. Among these last are falcons, called here *peregrins*. Amongst the birds common here are migratory sea-birds, that breed in the

Isle of Ramsey, and the adjoining rocks called *The Bishop and his Clerks*. About the beginning of April such flocks of birds, of several sorts, resort to these rocks, as appear incredible to those who have not seen them. They come to them in the night-time, and also leave them then; for, in the evening, the rocks may be seen covered with them, and the next morning not one be seen at all. In like manner, not a single bird shall appear in the evening, and the next morning the rocks shall be covered with them. They also generally make a visit about Christmas, staying a week or longer; and then take their leave till breeding-time. Among these birds are the eligug, razor-bill, puffin, and harry-bird. The eligug lays only one egg, which, as well as those of the puffin and razor-bill, is as big as a duck's, but longer, and smaller at one end. She never leaves it till it is hatched, nor then till the young one is able to follow her; and she is all this time fed by the male. This and the razor-bill breed upon the bare rocks, without any kind of nest. The puffin and harry-bird breed in holes, and commonly in the holes of rabbits; but sometimes they dig holes for themselves with their beaks. The harry-birds are never seen on land but when taken. All the four kinds cannot raise themselves to fly away when they are on land, and therefore they creep or waddle to the cliffs, and throwing themselves off, take wing. The eligug is the same bird which they call in Cornwall *kiddarw*, and in Yorkshire a *scout*. The razor-bill is the *merre* of Cornwall. The puffin is the *arctic duck* of Clusius, and the harry-bird the *shire-water* of Sir Thomas Brown. The inhabitants of this county make a very pleasant durable fire of culm, which is the dust of coal made up into balls with a third part of mud. The county is well watered by the rivers Clethy, Dogle-dye, Cledhew, and Teive; which last parts it from Cardiganshire. There is a division of the county styled *Rhos* in the Welch, by which is meant a large green plain. This is inhabited by the descendants of the Flemings, placed there by Henry I. to curb the Welch, who were never able to expel them, though they often attempted it. On the coasts of this county, as well as on those of Glamorganshire and the Severn Sea, is found a kind of alga or laver, the *laduca marina* of Camden, being a marine plant or weed. It is gathered in spring; of which the inhabitants make a sort of food, called in Welch *lbavan*, and in English *black-butter*. Having washed it clean, they lay it to sweat between two flat stones, then shred it small, and knead it well, like dough for bread, and then make it up into great balls or rolls, which is by some eat raw, and by others fried with oatmeal and butter. It is accounted excellent against all distempers of the liver and spleen; and some affirm that they have been relieved by it in the sharpest fits of the stone.

PEN, a town of Somersetshire, in England, on the north-east side of Wincaunton, where Kenwald a West Saxon-king so totally defeated the Britons, that they were never after able to make head against the Saxons; and where, many ages after this, Edmund Ironside gained a memorable victory over the Danes, who had before, *i. e.* in 1001, defeated the Saxons in that same place.

PEN, a little instrument, usually formed of a quill, serving to write withal.

Pembroke-
shire,
Pen.

Pen.

Pens are also sometimes made of silver, brass, or iron.

Dutch Pens are made of quills that have passed thro' hot ashes, to take off the grosser fat and moisture, and render them more transparent.

Fountain Pen, is a pen made of silver, brass, &c. contrived to contain a considerable quantity of ink, and let it flow out by gentle degrees, so as to supply the writer a long time without being under the necessity of taking fresh ink.

The fountain-pen is composed of several pieces, as in Plate CCCLXXXII. where the middle piece F carries the pen, which is screwed into the inside of a little pipe, which again is soldered to another pipe of the same bigness as the lid G; in which lid is soldered a male serew, for screwing on the cover, as also for stopping a little hole at the place and hindering the ink from passing through it. At the other end of the piece F is a little pipe, on the outside of which the top-cover H may be screwed. In the cover there goes a post-crayon, which is to be screwed into the last-mentioned pipe, in order to stop the end of the pipe, into which the ink is to be poured by a funnel. To use the pen, the cover G must be taken off, and the pen a little shaken, to make the ink run more freely.

There are, it is well known, some instruments used by practical mathematicians, which are called *pens*, and which are distinguished according to the use to which they are principally applied; as for example, the drawing pen, &c. an instrument too common to require a particular description in this place. But it may be proper to take some notice of the geometric pen, as it is not so well known, nor the principles on which it depends so obvious.

The *geometric Pen* is an instrument in which, by a circular motion, a right line, a circle, an ellipse, and other mathematical figures, may be described. It was first invented and explained by John Baptist Suardi, in a work intitled *Nouvo Istromenti per la Descrizzione di diverse Curve Antichi e Moderne*, &c. Several writers had observed the curves arising from the compound motion of two circles, one moving round the other; but Suardi first realized the principle, and first reduced it to practice. It has been lately introduced with success into the steam-engine by Watt and Bolton. The number of curves this instrument can describe is truly amazing; the author enumerates not less than 1273, which (he says) can be described by it in the simple form. We shall give a short description of it from Adam's Geometrical and Graphical Essays.

"Plate CCCLXXXII. fig. 10. represents the geometric pen; A, B, C, the stand by which it is supported; the legs A, B, C are contrived to fold one within the other for the convenience of packing. A strong axis D is fitted to the top of the frame; to the lower part of this axis any of the wheels (as *i*) may be adapted; when screwed to it they are immoveable. EG is an arm contrived to turn round upon the main axis D; two sliding boxes are fitted to this arm; to these boxes any of the wheels belonging to the geometric pen may be fixed, and then slid so that the wheels may take into each other and the immoveable wheel *i*; it is evident, that by making the arm EG re-

volve round the axis D, these wheels will be made to revolve also, and that the number of their revolutions will depend on the proportion between the teeth. Fg is an arm carrying the pencil; this arm slides backwards and forwards in the box *cd*, in order that the distance of the pencil from the centre of the wheel *b* may be easily varied; the box *cd* is fitted to the axis of the wheel *b*, and turns round with it, carrying the arm *fg* along with it: it is evident, therefore, that the revolutions will be fewer or greater in proportion to the difference between the numbers of the teeth in the wheels *b* and *i*; this bar and socket are easily removed for changing the wheels. When two wheels only are used, the bar *fg* moves in the same direction with the bar EG; but if another wheel is introduced between them, they move in contrary directions.

"The number of teeth in the wheels, and consequently the relative velocity of the epicycle or arm *fg*, may be varied in *infinitum*. The numbers we have used are 8, 16, 24, 32, 40, 48, 56, 64, 72, 80, 88, 96.

"The construction and application of this instrument is so evident from the figure, that nothing more need be pointed out than the combinations by which various figures may be produced. We shall take two as examples:

"The radius of EG (fig. 11.) must be to that of *fg* as 10 to 5 nearly; their velocities, or the number of teeth in the wheels, to be equal; the motion to be in the same direction.

"If the length of *fg* be varied, the looped figure delineated at fig. 12. will be produced. A circle may be described by equal wheels, and any radius but the bars must move in contrary directions.

"To describe by this circular motion a straight line and an ellipse. For a straight line, equal radii, the velocity as 1 to 2, the motion in a contrary direction; the same data will give a variety of ellipses, only the radii must be unequal; the ellipses may be described in any direction." See fig. 13.

PEN, or *Penstock*. See PENSTOCK.

Sea-PEN. See PENNATULA.

PENANCE, a punishment, either voluntary or imposed by authority, for the faults a person has committed. Penance is one of the seven sacraments of the Romish church. Besides fasting, alms, abstinence, and the like, which are the general conditions of penance, there are others of a more particular kind; as the repeating a certain number of ave-marys, paternosters, and credos, wearing a hair-shirt, and giving one's self a certain number of stripes. In Italy and Spain it is usual to see Christians almost naked, loaded with chains and a cross, and lashing themselves at every step.

PENATES, in Roman antiquity, a kind of tutelary deities, either of countries or particular houses; in which last sense they differed in nothing from the lares. See LARES.

The penates were properly the tutelary gods of the Trojans, and were only adopted by the Romans, who gave them the title of *penates*.

PENCIL, an instrument used by painters for laying on their colours. Pencils are of various kinds, and made of various materials; the largest sorts are made of boars bristles, the thick ends of which are bound to a stick, bigger or less according to the uses they

Pen.

Pencil.

Pencil, Pendant. they are designed for: these, when large, are called *brushes*. The finer sorts of pencils are made of camels, badgers, and squirrels hair, and of the down of swans; these are tied at the upper end with a piece of strong thread, and inclosed in the barrel of a quill.

All good pencils, on being drawn between the lips, come to a fine point.

PENCIL, is also an instrument used in drawing, writing, &c. made of long pieces of black-lead or red-chalk, placed in a groove cut in a slip of cedar; on which other pieces of cedar being glued, the whole is planed round, and one of the ends being cut to a point, it is fit for use.

Black-lead in fine powder, stirred into melted sulphur, unites with it so uniformly, and in such quantity, in virtue perhaps of its abounding with sulphur, that though the compound remains fluid enough to be poured into moulds, it looks nearly like the coarser sorts of black-lead itself. Probably the way which Prince Rupert is said to have had, mentioned in the third volume of Dr Birch's History of the Royal Society, of making black-lead run like a metal in a mould, so as to serve for black-lead again, consisted in mixing with it sulphur or sulphureous bodies.

On this principle the German black-lead pencils are said to be made; and many of those which are hawked about by certain persons among us are prepared in the same manner: their melting or softening, when held to a candle, or applied to a red-hot iron, and yielding a bluish flame, with a strong smell like that of burning brimstone, betrays their composition; for black-lead itself yields no smell or fume, and suffers no apparent alteration in that heat. Pencils made with such additions are of a very bad kind; they are hard, brittle, and do not ease or make a mark freely either on paper or wood, rather cutting or scratching them than leaving a coloured stroke.

The true English pencils (which Vogel in his mineral system, and some other foreign writers, imagine to be prepared also by melting the black-lead with some additional substances, and casting it into a mould) are formed of black-lead alone sawed into slips, which are fitted into a groove made in a piece of wood, and another slip of wood glued over them: the softest wood, as cedar, is made choice of, that the pencil may be the easier cut; and a part at one end, too short to be conveniently used after the rest has been worn and cut away, is left unfilled with the black-lead, that there may be no waste of so valuable a commodity. These pencils are greatly preferable to the others, though seldom so perfect as could be wished, being accompanied with some degree of the same inconveniences, and being very unequal in their quality, on account of different sorts of the mineral being fraudulently joined together in one pencil, the fore-part being commonly pretty good, and the rest of an inferior kind. Some, to avoid these imperfections, take the finer pieces of black lead itself, which they saw into slips, and fix for use in port-crayons: this is doubtless the surest way of obtaining black-lead crayons, whose goodness can be depended on.

PENDANT, an ornament hanging at the ear, frequently composed of diamonds, pearls, and other jewels.

PENDANTS, in heraldry, parts hanging down from the label, to the number of three, four, five, or six at most, resembling the drops in the Doric freeze. When they are more than three, they must be specified in blazoning.

PENDANTS of a Ship, are those streamers, or long colours, which are split and divided into two parts, ending in points, and hung at the head of masts, or at the yard-arm ends.

PENDENE-Vow, in Cornwall, in England, on the north coast, by Morvath. There is here an unfathomable cave under the earth, into which the sea flows at high-water. The cliffs between this and St Ives shine as if they had store of copper, of which indeed there is abundance within-land.

PENDENNIS, in Cornwall, at the mouth of Falmouth-haven, is a peninsula of a mile and a half in compass. On this Henry VIII. erected a castle, opposite to that of St Maw's, which he likewise built. It was fortified by Queen Elizabeth, and served then for the governor's house. It is one of the largest castles in Britain, and is built on a high rock. It is stronger by land than St Maw's, being regularly fortified, and having good outworks.

PENDULOUS, a term applied to any thing that bends or hangs downwards.

PENDULUM, a vibrating body suspended from a fixed point. For the history of this invention, see the article **CLOCK**.

The theory of the pendulum depends on that of the inclined plane. Hence, in order to understand the nature of the pendulum, it will be necessary to premise some of the properties of this plane; referring, however, to *Inclined PLANE*, and Section VI. in the article **MECHANICS**, for the demonstration.

I. Let AC (fig. 1.) be an inclined plane, AB its perpendicular height, and D any heavy body: then the force which impels the body D to descend along the inclined plane AC, is to the absolute force of gravity as the height of the plane AB is to its length AC; and the motion of the body will be uniformly accelerated.

II. The velocity acquired in any given time by a body descending on an inclined plane AC, is to the velocity acquired in the same time by a body falling freely and perpendicularly as the height of the plane AB to its length AC. The final velocities will be the same; the spaces described will be in the same ratio; and the times of description are as the spaces described.

III. If a body descend along several contiguous planes, AB, BC, CD, (fig. 2.) the final velocity, namely, that at the point D, will be equal to the final velocity in descending through the perpendicular AE, the perpendicular heights being equal. Hence, if these planes be supposed indefinitely short and numerous, they may be conceived to form a curve; and therefore the final velocity acquired by a body in descending through any curve AF, will be equal to the final velocity acquired in descending through the planes AB, BC, CD, or to that in descending through AE, the perpendicular heights being equal.

IV. If from the upper or lower extremity of the vertical diameter of a circle a cord be drawn, the

Plate
CCCLXXX.

Pendulum. time of descent along this cord will be equal to the time of descent through the vertical diameter; and therefore the times of descent through all cords in the same circle, drawn from the extremity of the vertical diameter, will be equal.

V. The times of descent of two bodies through two planes equally elevated will be in the subduplicate ratio of the lengths of the planes. If, instead of one plane, each be composed of several contiguous planes similarly placed, the times of descent along these planes will be in the same ratio. Hence, also, the times of describing similar arches of circles similarly placed will be in the subduplicate ratio of the lengths of the arches.

VI. The same things hold good with regard to bodies projected upward, whether they ascend upon inclined planes or along the arches of circles.

The point or axis of suspension of a pendulum is that point about which it performs its vibrations, or from which it is suspended.

The centre of oscillation is a point in which, if all the matter in a pendulum were collected, any force applied at this centre would generate the same angular velocity in a given time as the same force when applied at the centre of gravity.

The length of a pendulum is equal to the distance between the axis of suspension and centre of oscillation.

Plate
CCCLXXX.

Let PN (fig. 3.) represent a pendulum suspended from the point P; if the lower part N of the pendulum be raised to A, and let fall, it will by its own gravity descend through the circular arch AN, and will have acquired the same velocity at the point N that a body would acquire in falling perpendicularly from C to N, and will endeavour to go off with that velocity in the tangent ND; but being prevented by the rod or cord, will move through the arch NB to B, where, losing all its velocity, it will by its gravity descend through the arch BN, and, having acquired the same velocity as before, will ascend to A. In this manner it will continue its motion forward and backward along the arch ANB, which is called an *oscillatory* or *vibratory* motion; and each swing is called a *vibration*.

PROP. I. If a pendulum vibrates in very small circular arches, the times of vibration may be considered as equal, whatever be the proportion of the arches.

Let PN (fig. 4.) be a pendulum; the time of describing the arch AB will be equal to the time of describing CD; these arches being supposed very small.

Join AN, CN; then since the times of descent along all cords in the same circles, drawn from one extremity of the vertical diameter, are equal; therefore the cords AN, CN, and consequently their doubles, will be described in the same time; but the arches AN, CN being supposed very small, will therefore be nearly equal to their cords: hence the times of vibrations in these arches will be nearly equal.

PROP. II. Pendulums which are of the same length vibrate in the same time, whatever be the proportion of their weights.

This follows from the property of gravity, which is always proportional to the quantity of matter, or to

its inertia. When the vibrations of pendulums are compared, it is always understood that the pendulums describe either similar finite arcs, or arcs of evanescent magnitude, unless the contrary is mentioned.

PROP. III. If a pendulum vibrates in the small arc of a circle, the time of one vibration is to the time of a body's falling perpendicularly through half the length of the pendulum as the circumference of a circle is to its diameter.

Let PE (fig. 5.) be the pendulum which describes the arch ANC in the time of one vibration; let PN be perpendicular to the horizon, and draw the cords AC, AN; take the arc Ee infinitely small, and draw EFG, efg perpendicular to PN, or parallel to AC; describe the semicircle BGN, and draw er, gs perpendicular to EG: now let t = time of descending through the diameter 2PN, or through the cord AN: Then the velocities gained by falling through 2PN, and by the pendulum's descending through the arch AE, will be as $\sqrt{2PN}$ and $\sqrt{BF}$; and the space described in the time t , after the fall through 2PN, is 4PN. But the times are as the spaces divided by the velocities.

Therefore $\frac{4PN}{\sqrt{2PN}}$ or $2\sqrt{2PN} : t :: \frac{Ee}{\sqrt{BF}}$: time of describing Ee = $\frac{t \times Ee}{2\sqrt{2PN} \times \sqrt{BF}}$. But in the similar triangles PEF, Eer, and KGF, Ggs,

$$\text{As } PE=PN : EF :: Ee : er = \frac{EF}{PN} \times Ee;$$

$$\text{And } KG=KD : FG :: Gg : Gs = \frac{FG}{KD} \times Gg.$$

$$\text{But } er = Gs; \text{ therefore } \frac{EF}{PN} \times Ee = \frac{FG}{KD} \times Gg.$$

$$\text{Hence } Ee = \frac{PN \times FG}{KD \times EF} \times Gg.$$

And by substituting this value of Ee in the former equation, we have the time of describing Ee = $\frac{t \times PN \times FG \times Gg}{2KD \times EF \times \sqrt{BF} \times 2PN}$: But by the nature of the circle $FG = \sqrt{BF \times FN}$, and $EF = \sqrt{PN + PF \times FN}$. Hence, by substitution, we obtain the time of describing

$$Ee = \frac{t \times PN \times \sqrt{BF \times FN} \times Gg}{2KD \times \sqrt{PN + PF \times FN} \times \sqrt{BF} \times 2PN} = \frac{t \times \sqrt{PN} \times Gg}{2KD \times \sqrt{PN + PF \times \sqrt{2}}} = \frac{t \times \sqrt{2PN} \times Gg}{4KD \times \sqrt{PN + PF}} = \frac{t \times \sqrt{2PN}}{2BN \times \sqrt{2PN - NF}} \times Gg.$$

But NF, in its mean quantity for all the arches Gg, is nearly equal to NK;

therefore the time of describing Ee = $\frac{t \times \sqrt{2PN}}{2BN \times \sqrt{2PN - NK}} \times Gg$. Whence the time of describing the arch AED = $\frac{t \times \sqrt{2PN}}{2BN \times \sqrt{2PN - NK}} \times BGN$; and the time of describing the whole arch ADC, or the time of one vibration, is = $\frac{t \times \sqrt{2PN}}{2BN \times \sqrt{2PN - NK}} \times 2BGN$. But

when the arch ANC is very small, NK vanishes, and then

Pendulum. then the time of vibration in a very small arc is

$$= \frac{t \times \sqrt{2PN}}{2BN \times \sqrt{2PN}} \times 2BGN = \frac{1}{2} t \times \frac{2BGN}{BN}$$

Now if t be the time of descent through $2PN$; then since the spaces described are as the squares of the times, $\frac{1}{2}t$ will be the time of descent through $\frac{1}{2}PN$: therefore the diameter BN is to the circumference $2BGN$, as the time of falling through half the length of the pendulum is to the time of one vibration.

PROP. IV. The length of a pendulum vibrating seconds is to twice the space through which a body falls in one second, as the square of the diameter of a circle is to the square of its circumference.

Let d = diameter of a circle = 1, c = circumference = 3.14159, &c. t to the time of one vibration, and p the length of the corruptory pendulum; then by

last proposition $c : d :: 1'' : \frac{d}{c}$ = time of falling through half the length of the pendulum. Let s = space described by a body falling perpendicularly in the first second: then since the spaces described are in the subduplicate ratio of the times of description, therefore

$$1'' : \frac{d}{c} :: \sqrt{s} : \sqrt{\frac{1}{2}p}. \text{ Hence } c^2 : d^2 :: 2s : p.$$

It has been found by experiment, that in latitude $51\frac{1}{2}^\circ$ a body falls about 16.11 feet in the first second: hence the length of a pendulum vibrating seconds in that latitude is $= \frac{32.22}{3.14159} = 3$ feet 3.174 inches.

PROP. V. The times of the vibrations of two pendulums in similar arcs of circles are in a subduplicate ratio of the lengths of the pendulums.

Let PN, PO (fig. 6.) be two pendulums vibrating in the similar arcs AB, CD ; the time of a vibration of the pendulum PN is to the time of a vibration of the pendulum PO in a subduplicate ratio of PN to PO .

Since the arcs AN, CO are similar and similarly placed, the time of descent through AN will be to the time of descent through CO in the subduplicate ratio of AN to CO : but the times of descent through the arcs AN and CO are equal to half the times of vibration of the pendulums PN, PO respectively. Hence the time of vibration of the pendulum PN in the arch AB is to the time of vibration of the pendulum PO in the similar arc CD in the subduplicate ratio of AN to CO : and since the radii PN, PO are proportional to the similar arcs AN, CO , therefore the time of vibration of the pendulum PN will be to the time of vibration of the pendulum PO in a subduplicate ratio of PN to PO .

If the length of a pendulum vibrating seconds be 39.174 inches, then the length of a pendulum vibrating half seconds will be 9.793 inches. For $1'' : \frac{1}{2}'' :: \sqrt{39.174} : \sqrt{x}$; and $1 : \frac{1}{4} :: 39.174 : x$. Hence $x = \frac{39.174}{4} = 9.793$.

PROP. VI. The lengths of pendulums vibrating in the same time, in different places, will be as the forces of gravity.

For the velocity generated in any given time is di-

rectly as the force of gravity, and inversely as the quantity of matter*. Now the matter being supposed the same in both pendulums, the velocity is as the force of gravity; and the space passed through in a given time will be as the velocity: that is, as the gravity.

Cor. Since the lengths of pendulums vibrating in the same time in small arcs are as the gravitating forces, and as gravity increases with the latitude on account of the spheroidal figure of the earth and its rotation about its axis; hence the length of a pendulum vibrating in a given time will be variable with the latitude, and the same pendulum will vibrate slower the nearer it is carried to the equator.

PROP. VII. The time of vibrations of pendulums of the same length, acted upon by different forces of gravity, are reciprocally as the square roots of the forces.

For when the matter is given, the velocity is as the force and time; and the space described by any given force is as the force and square of the time. Hence the lengths of pendulums are as the forces and the squares of the times of falling through them. But these times are in a given ratio to the times of vibration; whence the lengths of pendulums are as the forces and the squares of the times of vibration. Therefore, when the lengths are given, the forces will be reciprocally as the square of the times, and the times of vibration reciprocally as the square roots of the forces.

Cor. Let p = length of pendulum, g = force of gravity, and t = time of vibration. Then since $p = g \times t^2$. Hence $g = p \times \frac{1}{t^2}$; and $t = \sqrt{p \times \frac{1}{g}}$.

That is, the forces in different places are directly as the lengths of the pendulums, and inversely as the square roots of the times of vibration; and the times of vibration are directly as the square roots of the lengths of the pendulums, and inversely as the square roots of the gravitating forces.

PROP. VIII. A pendulum which vibrates in the arch of a cycloid describes the greatest and least vibrations in the same time.

This property is demonstrated only on a supposition that the whole mass of the pendulum is concentrated in a point: but this cannot take place in any really vibrating body; and when the pendulum is of finite magnitude, there is no point given in position which determines the length of the pendulum; on the contrary the centre of oscillation will not occupy the same place in the given body, when describing different parts of the tract it moves through, but will continually be moved in respect of the pendulum itself during its vibration. This circumstance has prevented any general determination of the time of vibration in a cycloidal arc, except in the imaginary case referred to.

There are many other obstacles which concur in rendering the application of this curve to the vibration of pendulums designed for the measures of time the source of errors far greater than those which by its peculiar property it is intended to obviate; and it is now wholly disused in practice.

Although the times of vibration of a pendulum in dif-

Pendulum.
 * See *Mechanics*, p. 774.

Pendulum. different arches be nearly equal, yet from what has been said, it will appear, that if the ratio of the least of these arches to the greatest be considerable, the vibrations will be performed in different times; and the difference, though small, will become sensible in the course of one or more days. In clocks used for astronomical purposes, it will therefore be necessary to observe the arc of vibration; which if different from that described by the pendulum when the clock keeps time, there a correction must be applied to the time shown by the clock. This correction, expressed in seconds of time, will be equal to the half of three times the difference of the square of the given arc, and of that of the arc described by the pendulum when the clock keeps time, these arcs being expressed in degrees*; and so much will the clock gain or lose according as the first of these arches is less or greater than the second.

* *Simpson's Fluxions*, p. 541.

Thus, if a clock keeps time when the pendulum vibrates in an arch of 3° , it will lose $10\frac{1}{2}$ seconds daily in an arch of 4° degrees.

For $4^2 - 3^2 \times \frac{1}{2} = 7 \times \frac{1}{2} = 10\frac{1}{2}$ seconds.

† See *Pyrometer*.

The length of a pendulum rod increases with heat; and the quantity of expansion answering to any given degree of heat is experimentally found by means of a pyrometer†; but the degree of heat at any given time is shown by a thermometer: hence that instrument should be placed within the clock-case at a height nearly equal to that of the middle of the pendulum; and its height, for this purpose, should be examined at least once a day. Now by a table constructed to exhibit the daily quantity of acceleration or retardation of the clock answering to every probable height of the thermometer, the corresponding correction may be obtained. It is also necessary to observe, that the mean height of the thermometer during the interval ought to be used. In Six's thermometer this height may be easily obtained; but in thermometers of the common construction it will be more difficult to find this mean.

It had been found, by repeated experiments, that a brass rod equal in length to a second pendulum will expand or contract $\frac{1}{1000}$ part of an inch by a change of temperature of one degree in Fahrenheit's thermometer; and since the times of vibration are in a subduplicate ratio of the lengths of the pendulum, hence an expansion or contraction of $\frac{1}{1000}$ part of an inch will answer nearly to one second daily: therefore a change of one degree in the thermometer will occasion a difference in the rate of the clock equal to one second daily. Whence, if the clock be so adjusted as to keep time when the thermometer is at 55° , it will lose 10 seconds daily when the thermometer is at 65° , and gain as much when it is at 45° .

Hence the daily variation of the rate of the clock from summer to winter will be very considerable. It is true indeed that most pendulums have a nut or regulator at the lower end, by which the bob may be raised or lowered a determinate quantity; and therefore, while the height of the thermometer is the same, the rate of the clock will be uniform. But since the state of the weather is ever variable, and as it is impossible to be raising or lowering the bob of the pendulum at every change of the thermometer, therefore the correction formerly mentioned is to be applied. This correction, however, is in some measure liable to a

small degree of uncertainty; and in order to avoid it altogether, several contrivances have been proposed by constructing a pendulum of different materials, and so disposing them that their effects may be in opposite directions, and thereby counterbalance each other; and by this means the pendulum will continue of the same length.

Mercurial PENDULUM. The first of these inventions is that by the celebrated Mr George Graham. In this, the rod of the pendulum is a hollow tube, in which a sufficient quantity of mercury is put. Mr Graham first used a glass tube, and the clock to which it was applied was placed in the most exposed part of the house. It was kept constantly going, without having the hands or pendulum altered, from the 9th of June 1722 to the 14th of October 1725, and its rate was determined by transits of fixed stars. Another clock made with extraordinary care, having a pendulum about 60 pounds weight, and not vibrating above one degree and a half from the perpendicular, was placed beside the former, in order the more readily to compare them with each other, and that they might both be equally exposed. The result of all the observations was this, that the irregularity of the clock with the quicksilver pendulum exceeded not, when greatest, a sixth part of that of the other clock with the common pendulum, but for the greatest part of the year not above an eighth or ninth part; and even this quantity would have been lessened, had the column of mercury been a little shorter: for it differed a little the contrary way from the other clock, going faster with heat and slower with cold. To confirm this experiment more, about the beginning of July 1723 Mr Graham took off the heavy pendulum from the other clock, and made another with mercury, but with this difference, that instead of a glass tube he used a brass one, and varnished the inside to secure it from being injured by the mercury. This pendulum he used afterwards, and found it about the same degree of exactness as the other.

Mercurial Pendulum.

Phil. Transf. 1726, p. 392.

The **Gridiron PENDULUM** is an ingenious contrivance for the same purpose. Instead of one rod, this pendulum is composed of any convenient odd number of rods, as five, seven, or nine; being so connected, that the effect of one set of them counteracts that of the other set; and therefore, if they are properly adjusted to each other, the centres of suspension and oscillation will always be equidistant. Fig. 7. represents a gridiron pendulum composed of nine rods, steel and brass alternately. The two outer rods, AB, CD, which are of steel, are fastened to the cross pieces AC, BD by means of pins. The next two rods, EF, GH, are of brass, and are fastened to the lower bar BD, and to the second upper bar EG. The two following rods are of steel, and are fastened to the cross bars EG and IK. The two rods adjacent to the central rod being of brass, are fastened to the cross pieces IK and LM; and the central rod, to which the ball of the pendulum is attached, is suspended from the cross piece LM, and passes freely through a perforation in each of the cross bars IK, BD. From this disposition of the rods, it is evident that, by the expansion of the extreme rods, the cross piece BD, and the two rods attached to it, will descend: but since these rods are expanded by the same heat, the cross piece EG will consequent-

Gridiron Pendulum.

Plate CCCLXXX.

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PENDULUM.

Plate CCCLXXX.

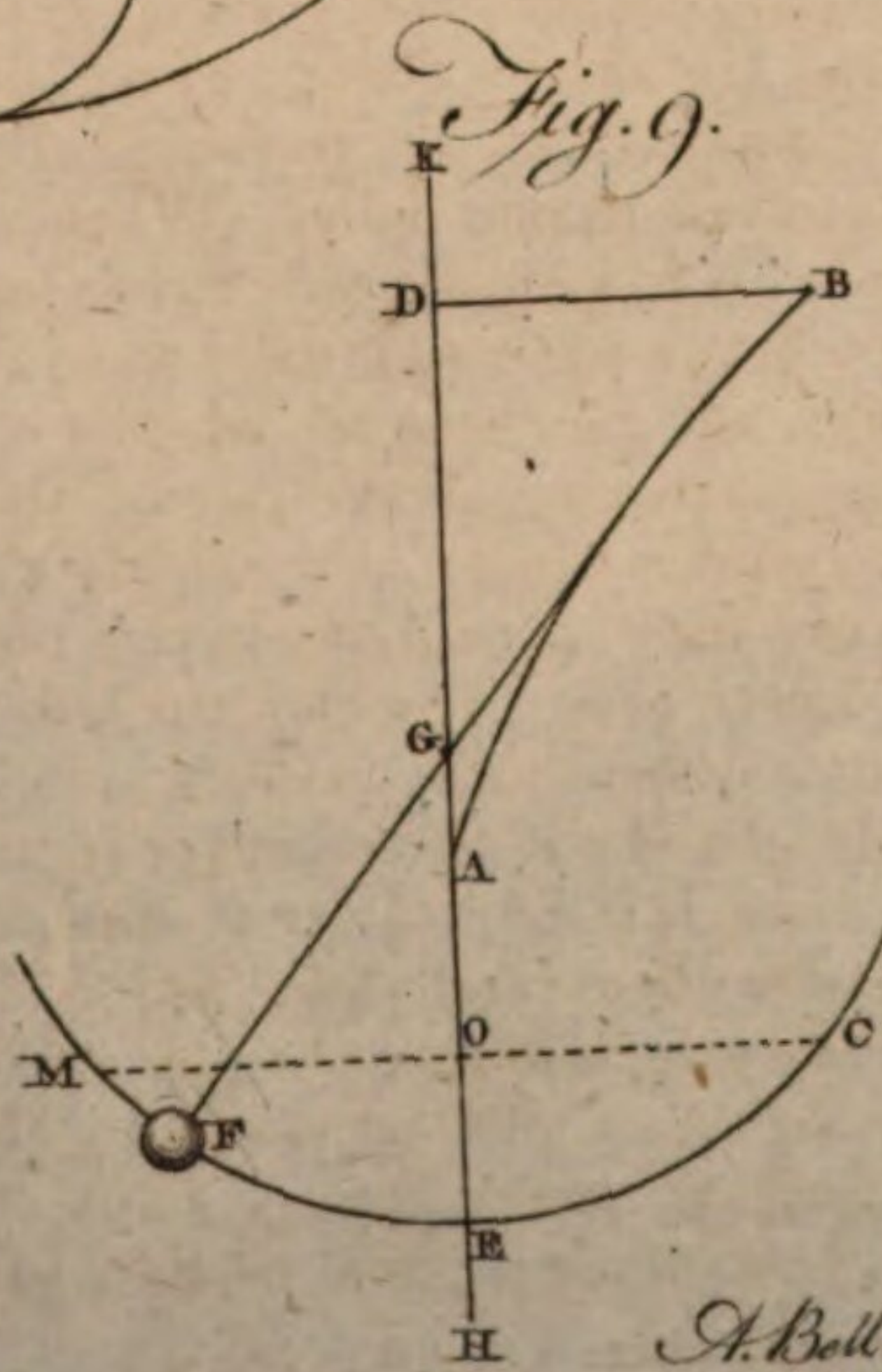
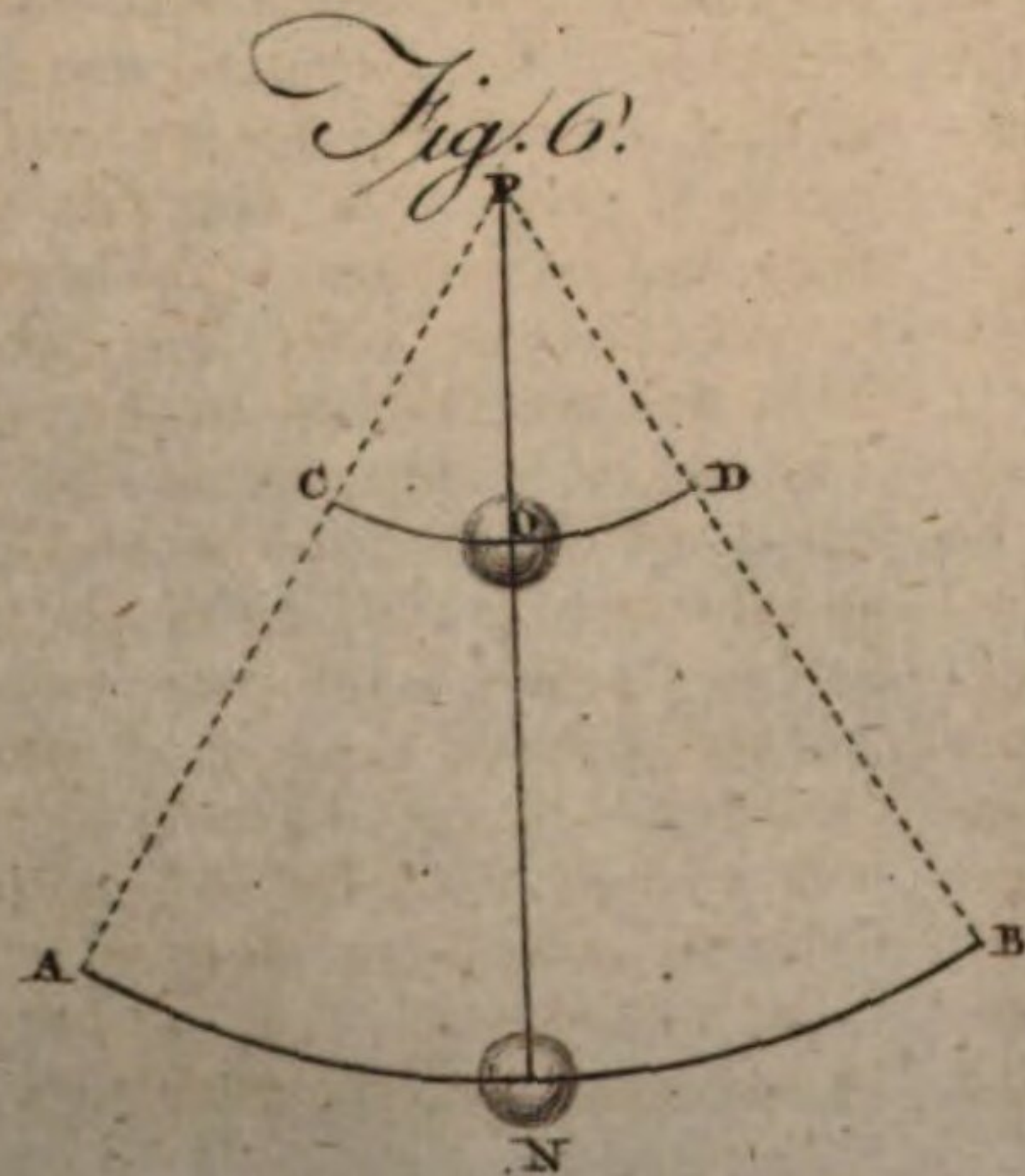
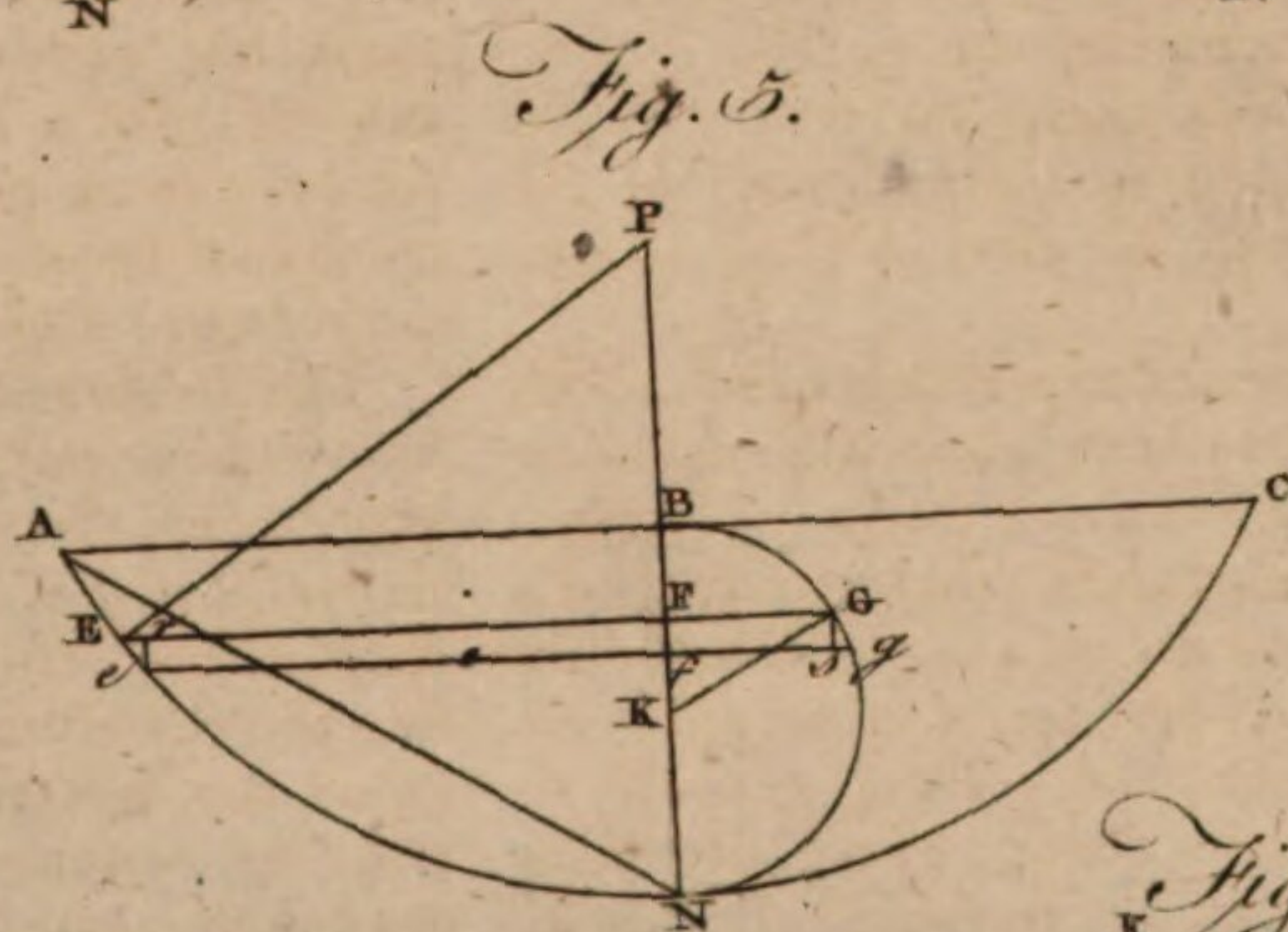
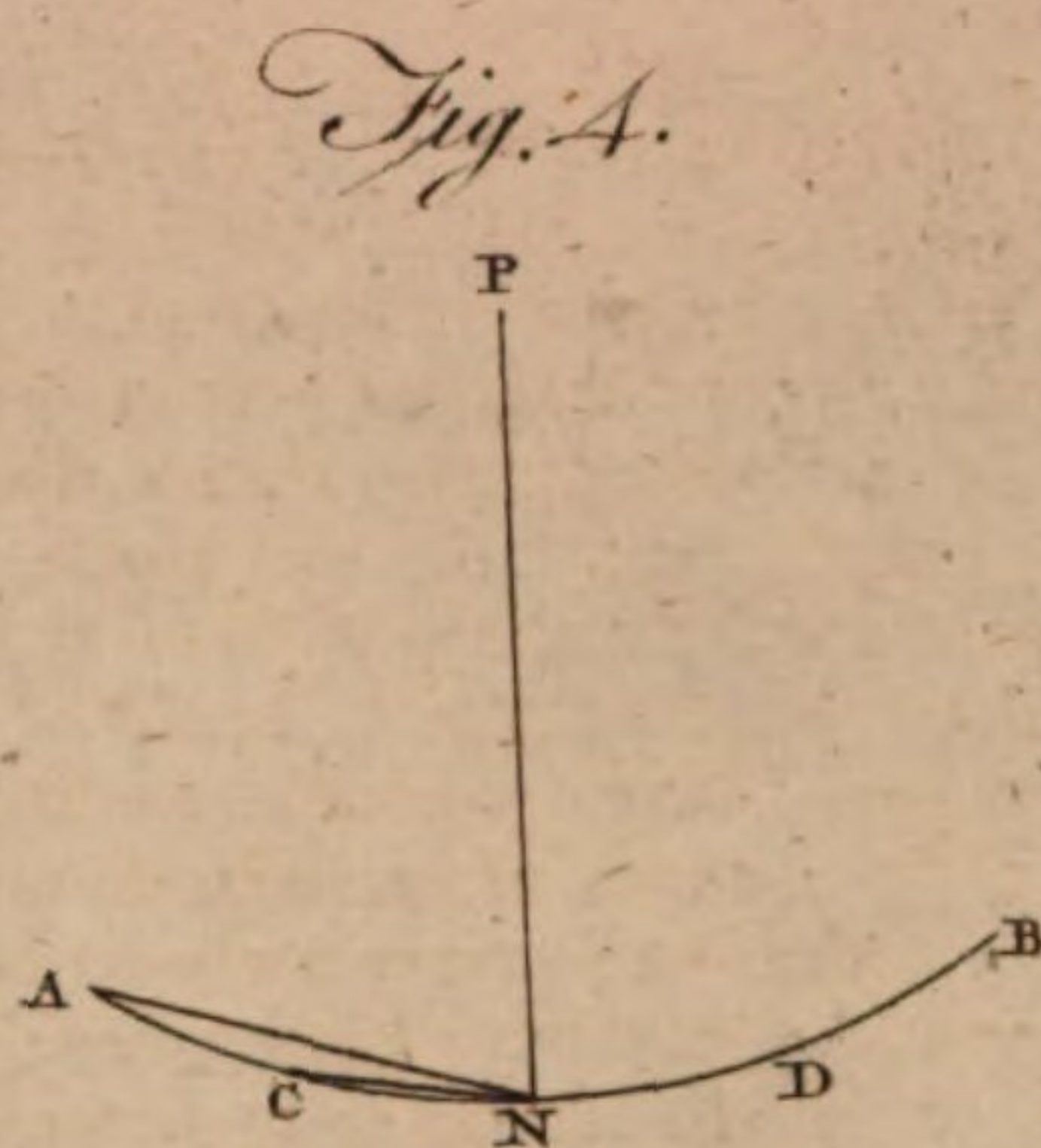
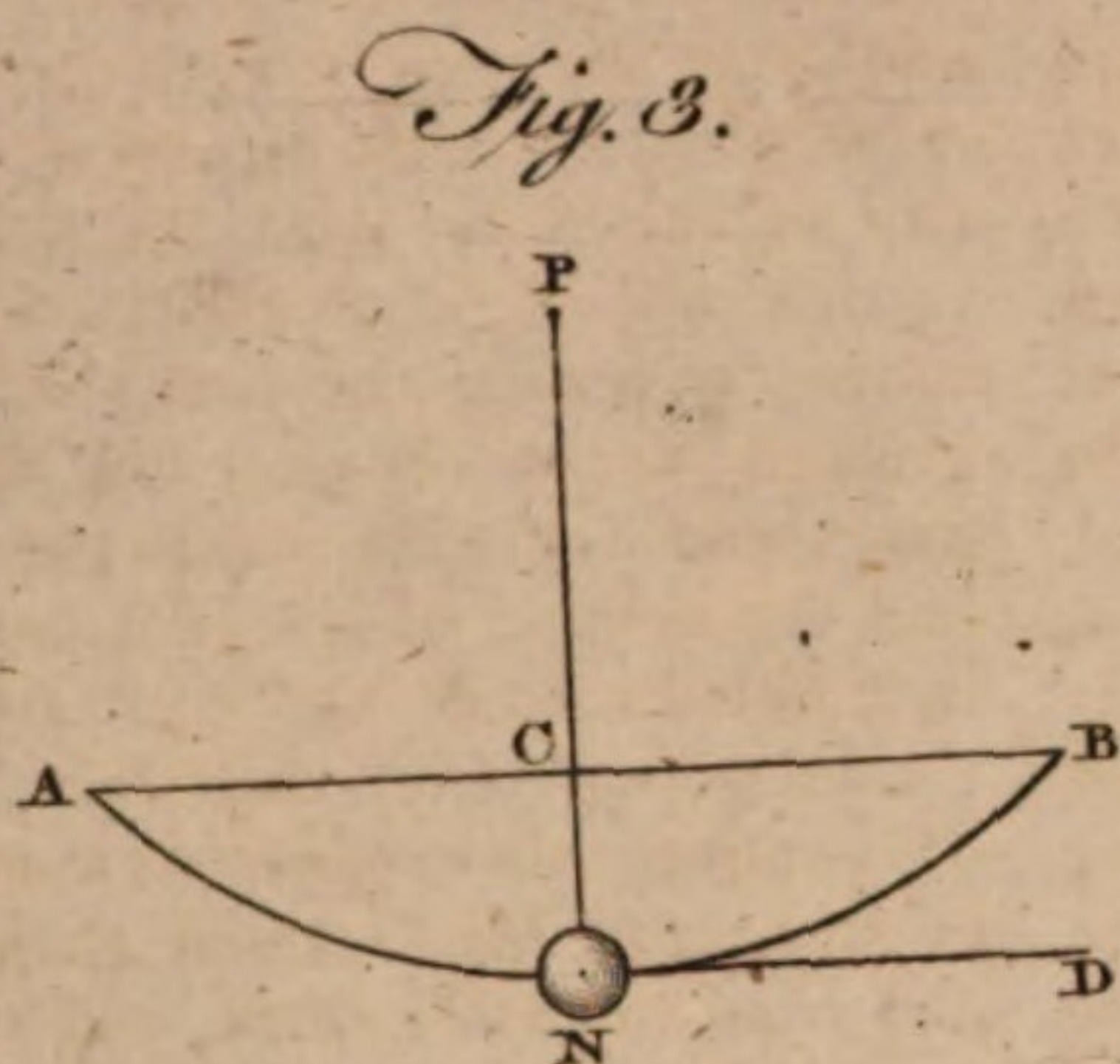
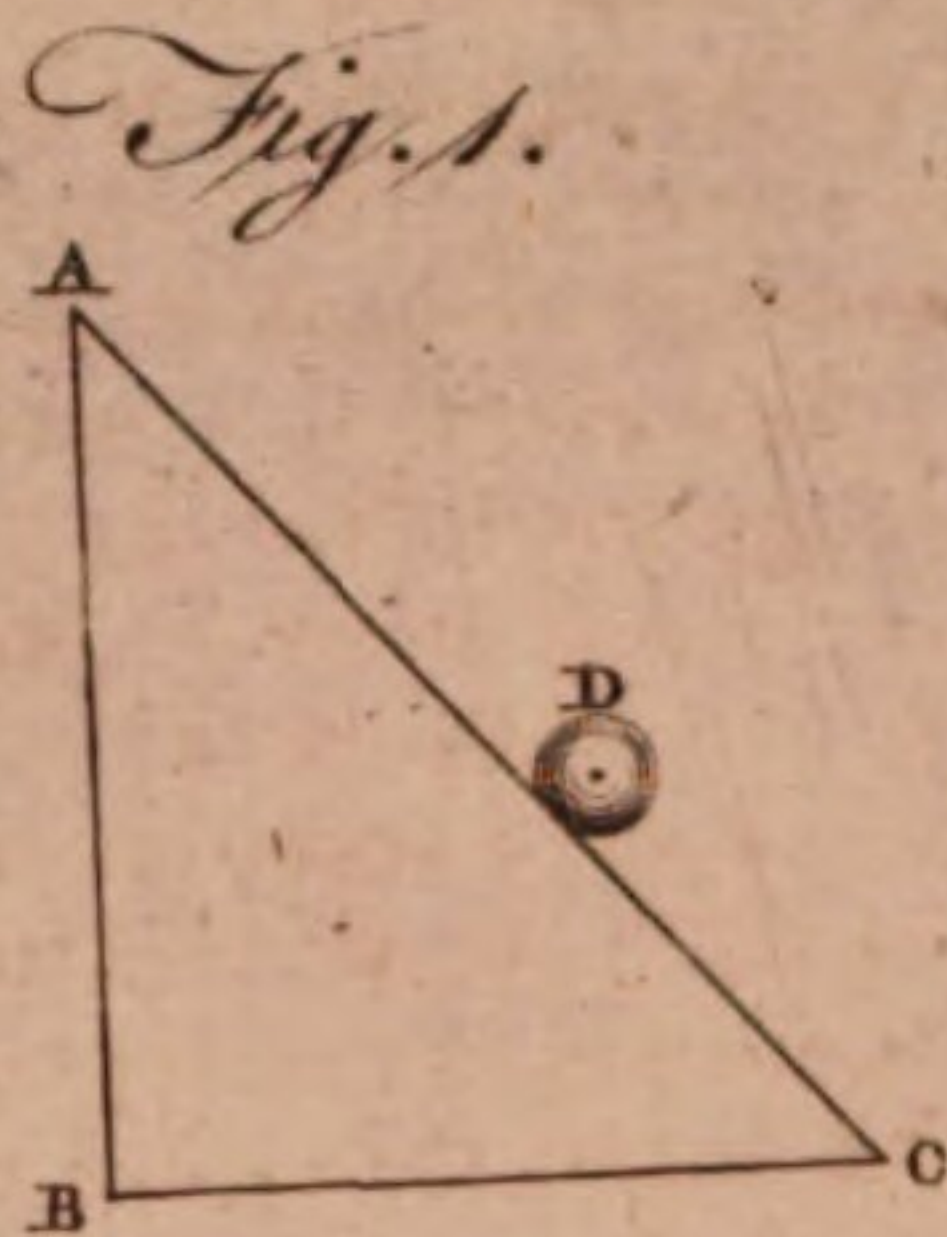
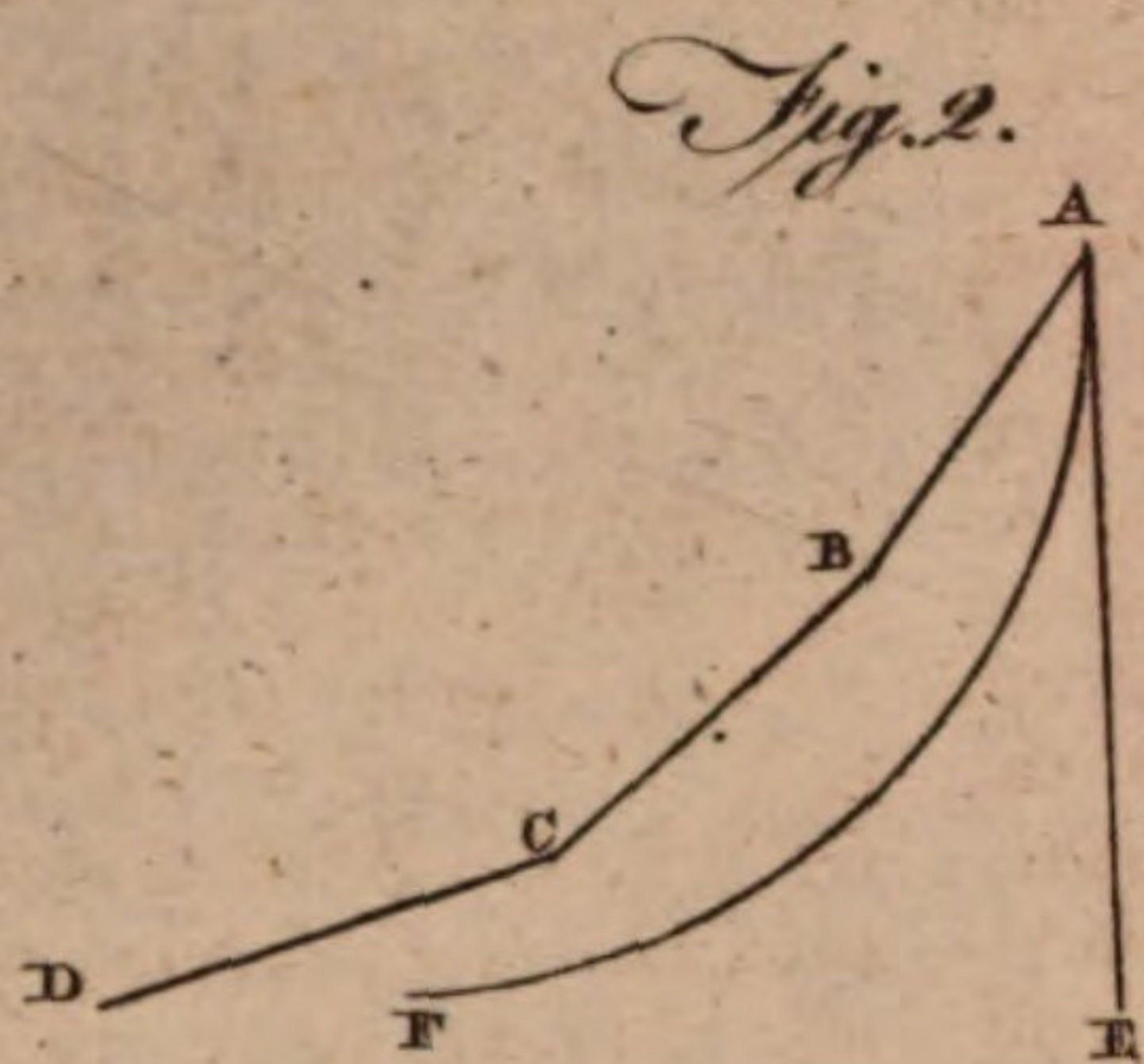
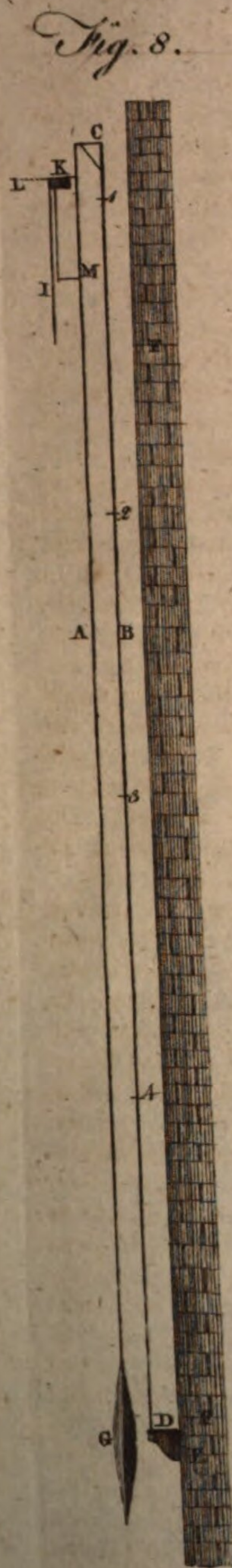
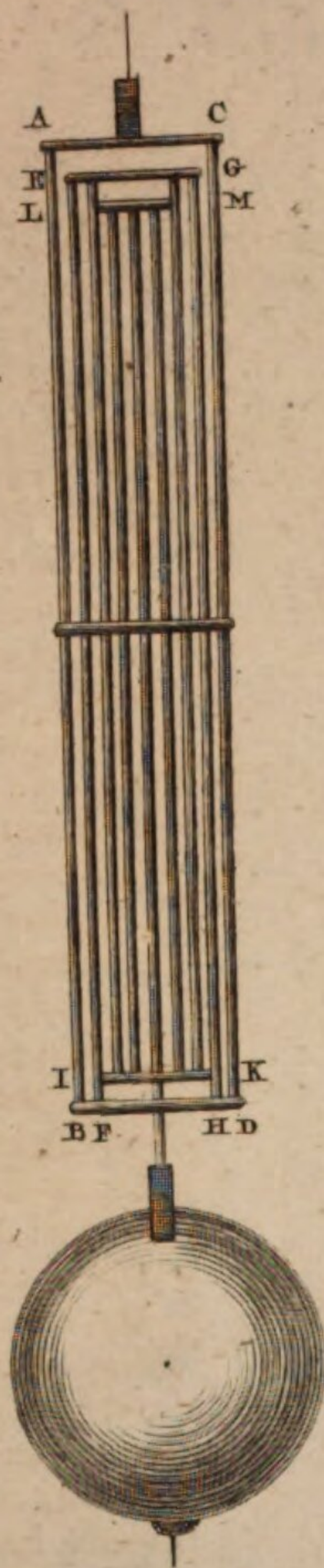


Fig. 7.



A. Bell. Pin. Wal. Sculptor. fecit.

Pendulum. ly be raised, and therefore also the two next rods; but because these rods are also expanded, the cross bar IK will descend; and by the expansion of the two next rods, the piece LM will be raised a quantity sufficient to counteract the expansion of the central rod. Whence it is obvious, that the effect of the steel rods is to increase the length of the pendulum in hot weather, and to diminish it in cold weather, and that the brass rods have a contrary effect upon the pendulum. The effect of the brass rods must, however, be equivalent not only to that of the steel rods, but also to the part above the frame and spring, which connects it with the cock, and to that part between the lower part of the frame and the centre of the ball.

M. Thout. Another excellent contrivance for the same purpose is described in a French author on clock-making. It was used in the north of England by an ingenious artist about 40 years ago. This invention is as follows: A bar of the same metal with the rod of the pendulum, and of the same dimensions, is placed against the back-part of the clock-case: from the top of this a part projects, to which the upper part of the pendulum is connected by two fine pliable chains or silken strings, which just below pass between two plates of brass, whose lower edges will always terminate the length of the pendulum at the upper end. These plates are supported on a pedestal fixed to the back of the case. The bar rests upon an immovable base at the lower part of the case; and is inserted into a groove, by which means it is always retained in the same position. From this construction, it is evident that the extension or contraction of this bar, and of the rod of the pendulum, will be equal, and in contrary directions. For suppose the rod of the pendulum to be expanded any given quantity by heat; then, as the lower end of the bar rests upon a fixed point, the bar will be expanded upwards, and raise the upper end of the pendulum just as much as its length was increased; and hence its length below the plates will be the same as before.

Plate
CCCLXXX.

Of this pendulum, somewhat improved by Mr Crosthwaite watch and clockmaker, Dublin, we have the following description in the Transactions of the Royal Irish Academy, 1788.—“A and B (fig. 8.) are two rods of steel forged out of the same bar, at the same time, of the same temper, and in every respect similar. On the top of B is formed a gibbet C; this rod is firmly supported by a steel bracket D, fixed on a large piece of marble E, firmly set into the wall F, and having liberty to move freely upwards between cross staples of brass, 1, 2, 3, 4, which touch only in a point in front and rear (the staples having been carefully formed for that purpose); to the other rod is firmly fixed by its centre the lens G; of 24 pounds weight, although it should in strictness be a little below it. This pendulum is suspended by a short steel spring on the gibbet at C; all which is entirely independent of the clock. To the back of the clock-plate I are firmly screwed two cheeks nearly cycloidal at K, exactly in a line with the centre of the verge L. The maintaining power is applied by a cylindrical steel-stud, in the usual way of regulators, at M. Now, it is very evident, that any expansion or contraction that takes place in either of these exactly similar rods, is instantly counteracted by the other; whereas in all compensation pendulums composed of different materials, however

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just calculation may seem to be, that can never be the case, as not only different metals, but also different bars of the same metal that are not manufactured at the same time, and exactly in the same manner, are found by a good pyrometer to differ materially in their degrees of expansion and contraction, a very small change affecting one and not the other.”

The expansion or contraction of straight-grained fir wood lengthwise, by change of temperature, is so small, that it is found to make very good pendulum rods. The wood called *sapadillo* is said to be still better. There is good reason to believe, that the previous baking, varnishing, gilding, or soaking of these woods in any melted matter, only tends to impair the property that renders them valuable. They should be simply rubbed on the outside with wax and a cloth. In pendulums of this construction the error is greatly diminished, but not taken away.

Angular PENDULUM, is formed of two pieces or legs like a sector, and is suspended by the angular point. This pendulum was invented with a view to diminish the length of the common pendulum, but at the same time to preserve or even increase the time of vibration. In this pendulum, the time of vibration depends on the length of the legs, and on the angle contained between them conjointly, the duration of the time of vibration increasing with the angle. Hence a pendulum of this construction may be made to oscillate in any given time. At the lower extremity of each leg of the pendulum is a ball or bob as usual. It may be easily shown, that in this kind of a pendulum, the squares of the times of vibration are as the secants of half the angle contained by the legs: hence if a pendulum of this construction vibrates half seconds when its legs are close, it will vibrate whole seconds when the legs are opened, so as to contain an angle equal to $151^{\circ} 2\frac{1}{2}'$.

The Conical or Circular PENDULUM, is so called from the figure described by the string or ball of the pendulum. This pendulum was invented by Mr Huygens, and is also claimed by Dr Hook.

In order to understand the principles of this pendulum, it will be necessary to premise the following lemma, viz. the times of all the circular revolutions of a heavy globular body, revolving within an inverted hollow paraboloid, will be equal whatever be the radii of the circles described by that body.

In order, therefore, to construct the pendulum so that its ball may always describe its revolutions in a paraboloid surface, it will be necessary that the rod of the pendulum be flexible, and that it be suspended in such a manner as to form the evolute of the given parabola. Hence, let KH (fig. 9.) be an axis perpendicular to the horizon, having a pinion at K moved by the last wheel in the train of the clock; and a hardened steel point at H moving in an agate pivot, to render the motion as free as possible. Now, let it be required that the pendulum shall perform each revolution in a second, then the paraboloid surface it moves in must be such whose *latus rectum* is double the length of the common half second pendulum. Let O be the focus of the parabola MEC, and MC the *latus rectum*; and make $AE=MO=\frac{1}{2}MC$ the length of a common half second pendulum. At the point A of the verge, let a thin plate AB be fixed at one end, and at the other end B let it be fastened to a bar or arm BD perpendicular-

Q

Pendulum
||
Penelope.

pendicular to DH, and to which it is fixed at the point D. The figure of the plate AB is that of the evolute of the given parabola MEC.

The equation of this evolute, being also that of the semicubical parabola, is $\frac{27}{16} p x^2 = y^3$.—Let $\frac{27}{16} p = P$; then $P x^2 = y^3$, and in the focus $P = 2y$. In this case $2x^2 = y^2 = \frac{1}{4} P^2$: hence $x^2 = \frac{1}{8} P^2$, and $x = P \sqrt{\frac{1}{8}} = \frac{27}{16} p \sqrt{\frac{1}{8}}$ = the distance of the focus from the vertex A.—By assuming the value of x , the ordinates of the curve may be found; and hence it may be easily drawn.

The string of the pendulum must be of such a length that when one end is fixed at B, it may lie over the plate AB, and then hang perpendicular from it, so that the centre of the bob may be at E when at rest. Now, the verge KH being put into motion, the ball of the pendulum will begin to gyrate, and thereby conceive a centrifugal force which will carry it out from the axis to some point F, where it will circulate seconds or half seconds, according as the line AE is 9.8 inches, or $2\frac{1}{4}$ inches, and AB answerable to it.

One advantage possessed by a clock having a pendulum of this construction is, that the second hand moves in a regular and uniform manner, without being subject to those jerks or starts as in common clocks; and the pendulum is entirely silent.

Theory has pointed out several other pendulums, known by the names of *Elliptic*, *Horizontal*, *Rotulary*, &c. pendulums. These, however, have not as yet attained that degree of perfection as to supplant the common pendulum.

Besides the use of the pendulum in measuring time, it has also been suggested to be a proper standard for measures of length. See the article MEASURE.

PENEA, in botany: A genus of the monogynia order, belonging to the tetrandria class of plants; and in the natural method ranking with those of which the order is doubtful. The calyx is diphyllous; the corolla campanulated; the style quadrangular; the capsule tetragonal, quadrilocular, and octospermous.

PENELOPE, in fabulous history, the daughter of Icarus, married Ulysses, by whom she had Telemachus. During the absence of Ulysses, who was gone to the siege of Troy, and who staid 20 years from his dominions, several princes, charmed with Penelope's beauty, told her that Ulysses was dead, offered to marry her, and pressed her to declare in their favour. She promised compliance on condition they would give her time to finish a piece of tapestry she was weaving; but at the same time she undid in the night what she had done in the day, and by this artifice eluded their importunity till Ulysses's return.

Plate
secLXXXI. PENELOPE, in ornithology: A genus of birds of the order of *gallinæ*, the characters of which are: The beak is bare at the base; the head is covered with feathers; the neck is quite bare; the tail consists of twelve principal feathers; and the feet are for the most part bare. Linnæus, in the *Systema Naturæ*, enumerates six species. 1. *Meleagris fasyra*, or horned pheasant. Latham calls it the horned turkey. This species is larger than a fowl, and smaller than a turkey. The colour of the bill is brown; the nostrils, forehead,

and space round the eyes, are covered with slender black hairy feathers; the top of the head is red. Behind each eye there is a fleshy callous blue substance like a horn, which tends backward. On the fore-part of the neck and throat, there is a loose flap of a fine blue colour, marked with orange spots, the lower part of which is beset with a few hairs; down the middle it is somewhat looser than on the sides, being wrinkled. The breast and upper part of the back are of a full red colour. The neck and breast are inclined to yellow. The other parts of the plumage and tail are of a rufous brown, marked all over with white spots, encompassed with black. The legs are somewhat white, and furnished with a spur behind each. A head of this bird, Mr Latham tells us, was sent to Dr Mead from Bengal, together with a drawing of the bird, which was called *napaul-pheasant*. It is a native of Bengal.

2. The *meleagris cristata*, called by Ray *penelope jacupeme*, and by Edwards the *guan*, or *quan*, is about the size of a fowl, being about two feet six inches long.—The bill is two inches long, and of a black colour; the irides are of a dirty orange colour; the sides of the head are covered with a naked purplish blue skin, in which the eyes are placed: beneath the throat, for an inch and a half, the skin is loose, of a fine red colour, and covered only with a few hairs. The top of the head is furnished with long feathers, which the bird can erect as a crest at pleasure; the general colour of the plumage is brownish black, glossed over with copper in some lights; but the wing coverts have a greenish and violet gloss. The quills mostly incline to a purple colour; the fore-part of the neck, breast, and belly, are marked with white spots; the thighs, under tail coverts, and the tail itself, are brownish black; the legs are red; the claws black. Some of these birds have little or no crest, and are thence supposed to be females.—They inhabit Brasil and Guiana, where they are often made tame. They frequently make a noise not unlike the word *jacu*. Their flesh is much esteemed.

3. *Crax Cumanensis*, called by Latham, &c. *yacou*. It is bigger than a common fowl. The bill is black; the head feathers are long, pointed, and form a crest, which can be erected at pleasure. The irides are of a pale rufous colour; the space round the eyes is naked, similar to that of a turkey. It has also a naked membrane, or kind of *wattle*, of a dull black colour.—The blue skin comes forward on the bill, but is not liable to change colour like that of the turkey. The plumage has not much variation; it is chiefly brown, with some white markings on the neck, breast, wing coverts, and belly; the tail is composed of twelve feathers, pretty long, and even at the end; the legs are red. This species inhabits Cayenne, but is a very rare bird, being met with only in the inner parts, or about the Amazons country, though in much greater plenty up the river Oyapoc, especially towards Camoupi; and indeed those which are seen at Cayenne are mostly tame ones, for it is a familiar bird, and will breed in that state, and mix with other poultry. It makes the nest on the ground, and hatches the young there, but is at other times mostly seen on trees. It frequently erects the crest, when pleased, or taken notice of, and likewise spreads the tail upright like a fan, in the manner of the turkey. It has two kinds of cry; one like that

Penelope. that of a young turkey, the other lower and more plaintive; the first of these is thought by the Indians to express the word *cuyovoit*, the other *yacou*.

4. The *pipile*, or, as it is called, *crax pipile*, is black in the belly, and the back brown stained with black. The flesh on the neck is of a green colour. It is about the bigness of the former, and has a hissing noise.—The head is partly black and partly white, and is adorned with a short crest. The space about the eyes, which are black, is white; the feet are red. It inhabits Guiana.

5. The *marail* is about the size of a fowl, and shaped somewhat like it. The bill and irides are blackish; the space round the eyes is bare, and of a pale red; the chin, throat, and fore-part of the neck, are scarcely covered with feathers; but the throat itself is bare, and the membrane elongated to half an inch or more; both this and the skin round the eyes change colour, and become deeper and thicker when the bird is irritated. The head feathers are longish, so as to appear like a crest when raised up, which the bird often does when agitated; at which time it also erects those of the whole body, and so disfigures itself as to be scarce known: the general colour of the plumage is a greenish black; the fore-part of the neck is tipped with white; the wings are short; the tail is long, consisting of 12 feathers, which are even at the end, and commonly pendent, but can be lifted up, and spread out like that of the turkey; the legs and toes are of a bright red; the claws are crooked, and somewhat sharp. In a collection (says Latham) from Cayenne was a bird, I believe, of this very species. It was 28 inches long; the bill is like that of a fowl, brown, and rather hooked; round the eye bare; the head is crested; the feathers of the fore-part of the neck are tipped with white; the breast and belly are rufous brown; the rest of the plumage is greenish brown; the tail is 11 inches long, and rounded at the end; the quills just reach beyond the rump; the legs are brown, and the claws hooked. This species is common in the woods of Guiana, at a distance from the sea, though it is much less known than could be imagined; and found in small flocks for the most part, except in breeding-time, when it is only seen by pairs, and then frequently on the ground, or on low shrubs; at other times on high trees, where it roosts at night. The female makes her nest on some low bushy tree, as near the trunk as possible, and lays three or four eggs. When the young are hatched, they descend with their mother, after 10 or 12 days. The mother acts as other fowls, scratching on the ground like a hen, and brooding the young, which quit their nurse the moment they can shift for themselves. They have two broods in a year; one in December or January, the other in May or June. The best time of finding these birds is morning or evening, being then met with on such trees whose fruit they feed on, and are discovered by some of it falling to the ground. The young birds are easily tamed, and seldom forsake the places where they have been brought up: they need not be housed, as they prefer the roosting on tall trees to any other place. Their cry is not inharmonious, except when irritated or wounded, when it is harsh and loud. Their flesh is much esteemed.

Buffon supposes this bird to be the female of the *yacou*, or at least a variety; but that this cannot be,

the anatomical inspection will at once determine. The windpipe of this bird has a singular construction, passing along the neck to the entrance of the breast, where it rises on the outside of the flesh, and, after going a little way downwards, returns, and then passes into the cavity of the lungs. It is kept in its place on the outside by a muscular ligament, which is perceivable quite to the breast-bone. This is found to be the case in both male and female, and plainly proves that it differs from the *yacou*, whose windpipe has no such circumvolution in either sex.

If this be the bird mentioned by Fermin, in his History of Guiana, p. 176. he says that the crest is cuneiform, and of a black and white colour; and observes that they are scarce at Surinam; but it does not seem quite certain whether he means this species or the *yacou*.

Bancroft mentions a bird of Guiana by the name of *Marrodée*, which he says is wholly of a brownish black: the bill the same; and the legs grey. These, he says, are common, and make a noise not unlike the name given it, perching on trees. The Indians imitate their cry so exactly, as to lead to the discovery of the place the birds are in, by their answering it. The flesh of them is like that of a fowl: it is therefore most likely the *marail*.

6. The *vociferating penelope*. The bill of this bird is of a greenish colour: the back is brown, the breast green, and the belly is of a whitish brown. Latham calls it the *crying curassaw*. It is about the bigness of a crow.

PENESTICA, (Antonine), a town of the Helvetii, situated between the Lacus Lausonius and Salodurum; called *Petenisca* by Peutinger. Thought now to be *Biel*, (Cluverius); the capital of a small territory in Switzerland.

PENEUS, (Strabo); a river running through the middle of Thessaly, from west to east, into the Sinus Thermaicus, between Olympus and Ossa, near Tempe of Thessaly, rising in mount Pindus, (Ovid, Val. Flaccus).

PENETRALE, a sacred room or chapel in private houses, which was set apart for the worship of the household gods among the ancient Romans. In temples also there were *penetralia*, or apartments of distinguished sanctity, where the images of the gods were kept, and certain solemn ceremonies performed.

PENGUIN, or PINGVIN. See PINGVIN.

PENICILLUS, among surgeons, is used for a tent to be put into wounds or ulcers.

PENIEL, or PENUEL, a city beyond Jordan, near the ford or brook Jabbok. This was the occasion of its name. Jacob, upon his return from Mesopotamia, (Gen. xxxii. 24, &c.) made a stop at the brook Jabbok: and very early the next morning, after he had sent all the people before, he remained alone, and behold an angel came, and wrestled with him till the day began to appear. Then the angel said to Jacob, Let me go, for the morning begins to appear. Jacob answered, I shall not let you go from me till you have given me your blessing. The angel blessed him then in the same place, which Jacob thence called Peniel, saying, I have seen God face to face, yet continue alive.

In following ages the Israelites built a city in this place, which was given to the tribe of Gad. Gideon, returning

Penestlos
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Peniel.

Peninnah
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Penitents.

returning from the pursuit of the Midianites, overthrew the tower of Peniel, (Judges viii. 17), and put all the inhabitants of the city to death, for having refused sustenance to him and his people, and having answered him in a very insulting manner. Jeroboam the son of Nebat rebuilt the city of Peniel, (1 Kings xii. 25.) Josephus says, that this prince there built himself a palace.

PENINNAH, the second wife of Elkanah, the father of Samuel. Peninnah had several children, (1 Sam. i. 2, 3, &c.), but Hannah, who afterwards was mother of Samuel, was for a great while barren: Peninnah, instead of giving the glory to God, the author of fruitfulness, was elevated with pride, and insulted her rival Hannah. But the Lord having visited Hannah, Peninnah was thereupon humbled; and some interpreters think, that God took away her children from her, or at least that she had no more after this time, according to the words of the song of Hannah, (1 Sam. ii. 5.), "The barren hath born seven, and she that hath many children is waxed feeble."

PENINSULA, in geography, a portion or extent of land joining to the continent by a narrow neck or isthmus, the rest being encompassed with water. See Plate CCXII.

PENIS, in anatomy. See there, p. 738. col. 2. &c.

PENITENCE, is sometimes used for a state of repentance, and sometimes for the act of repenting. See REPENTANCE. It is also used for a discipline, or punishment attending repentance; more usually called *penance*. It also gives title to several religious orders, consisting either of converted debauchees, and reformed prostitutes, or of persons who devote themselves to the office of reclaiming them. Of this latter kind is the

Order of PENITENCE of St Magdalen, established about the year 1272 by one Bernard, a citizen of Marseilles, who devoted himself to the work of converting the courtezans of that city. Bernard was seconded by several others; who, forming a kind of society, were at length erected into a religious order by Pope Nicholas III. under the rule of St Augustine. F. Gefnay says, that they also made a religious order of the penitents, or women they converted, giving them the same rules and observances which they themselves kept.

Congregation of PENITENCE of St Magdalen at Paris, owed its rise to the preaching of F. Tisseran, a Franciscan, who converted a vast number of courtezans about the year 1492. Louis duke of Orleans gave them his house for a monastery; or rather, as appears by their constitutions, Charles VIII. gave them the hotel called *Bochaigue*, whence they were removed to St George's chapel, in 1572. By virtue of a brief of Pope Alexander, Simon bishop of Paris, in 1497, drew them up a body of statutes, and gave them the rule of St Augustine. It was necessary, before a woman could be admitted, that she had first committed the sin of the flesh. None were admitted who were above 35 years of age. Till the beginning of the last century, none but penitents were admitted; but since its reformation by Mary Alvequin, in 1616, none have been admitted but maids, who, however, still retain the ancient name penitents.

PENITENTS, an appellation given to certain fra-

ternities penitents distinguished by the different shape and colour of their habits. These are secular societies, who have their rules, statutes, and churches, and make public processions under their particular crosses or banners. Of these there are more than a hundred, the most considerable of which are as follow: the white penitents, of which there are several different sorts at Rome, the most ancient of which was constituted in 1264; the brethren of this fraternity every year give portions to a certain number of young girls, in order to their being married: their habit is a kind of white sackcloth, and on the shoulder is a circle, in the middle of which is a red and white cross. Black penitents, the most considerable of which are the brethren of mercy, instituted in 1488 by some Florentines, in order to assist criminals during their imprisonment, and at the time of their death: on the day of execution, they walk in procession before them, singing the seven penitential psalms and the litanies; and after they are dead, they take them down from the gibbet and bury them; their habit is black sackcloth. There are others whose business it is to bury such persons as are found dead in the streets: these wear a death's head on one side of their habit. There are also blue, grey, red, green, and violet penitents; all which are remarkable for little else besides the different colours of their habits.

Mabillon tells us, that at Turin there are a set of penitents kept in pay to walk through the streets in procession, and cut their shoulders with whips, &c.

PENITENTS, or Converts of the Name of Jesus, a congregation of religious at Seville in Spain, consisting of women who had led a licentious life, founded in 1550. This monastery is divided into three quarters: one for professed religious; another for novices; a third for those who are under correction. When these last give signs of a real repentance, they are removed into the quarter of the novices, where, if they do not behave themselves well, they are remanded to their correction. They observe the rule of St Augustine.

PENITENTS of Orvieto, are an order of nuns, instituted by Antony Simoncelli, a gentleman of Orvieto in Italy. The monastery he built was at first designed for the reception of poor girls, abandoned by their parents, and in danger of losing their virtue. In 1662 it was erected into a monastery, for the reception of such as, having abandoned themselves to impurity, were willing to take up, and consecrate themselves to God by solemn vows. Their rule is that of the Carmelites.

These religious have this in peculiar, that they undergo no noviciate. All required is, that they continue a few months in the monastery in a secular habit; after which they are admitted to the vows.

PENITENTIAL, an ecclesiastical book retained among the Romanists; in which is prescribed what relates to the imposition of penance and the reconciliation of penitents. See PENANCE.

There are various penitentials, as the Roman penitential, that of the venerable Bede, that of Pope Gregory III. &c.

PENITENTIARY, in the ancient Christian church, a name given to certain presbyters or priests, appointed in every church to receive the private confessions of the people, in order to facilitate public discipline, by acquainting them what sins were to be expiated

Penitents
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Penitentiary.

Penitentiary
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Penn.

plated by public penance, and to appoint private penance for such private crimes as were not proper to be publicly censured.

PENITENTIARY, at the court of Rome, is an office in which are examined and delivered out the secret bulls, graces, or dispensations relating to cases of conscience, confessions, &c.

PENITENTIARY, is also an officer, in some cathedrals, vested with power from the bishop to absolve, in cases reserved to him. The pope has at present his grand penitentiary, who is a cardinal, and the chief of the other penitentiary priests established in the church of Rome, who consult him in all difficult cases. He presides in the penitentiary, dispatches dispensations, absolutions, &c. and has under him a regent and 24 proctors, or advocates of the sacred penitentiary.

PENMAN-MAWR, a mountain in Caernarvonshire, 1400 feet high. It hangs perpendicularly over the sea, at so vast a height, that few spectators are able to look down the dreadful steep. On the side which is next the sea, there is a road cut out of the side of the rock, about six or seven feet wide, which winds up a steep ascent, and used to be defended on one side only by a slight wall, in some parts about a yard high, and in others by only a bank, that scarce rose a foot above the road. The sea was seen dashing its waves 40 fathoms below, with the mountain rising as much above the traveller's head. This dangerous road was a few years ago secured by a wall breast-high, to the building of which the city of Dublin largely contributed, it being in the high road to Holyhead.

PENN (Sir William), was born at Bristol in 1621, and inclined from his youth to maritime affairs. He was made captain at 21 years of age, rear-admiral of Ireland at 23, vice-admiral of Ireland at 25, admiral to the Straits at 29, vice-admiral of England at 31, and general in the first Dutch war at 32. Whence returning in 1655, he was chosen representative for the town of Weymouth; and in 1660 was made commissioner of the admiralty and navy, governor of the town and fort of Kinsale, vice-admiral of Munster, and a member of that provincial council. In 1664 he was chosen great captain-commander under the duke of York, and distinguished himself in an engagement against the Dutch fleet; after which he took leave of the sea, but continued in his other employments till 1669. He died in 1670.

PENN (William), an eminent writer among the Quakers, and the planter and legislator of Pennsylvania, was the son of the above Sir William Penn, and was born at London in 1644. In 1660, he was entered a gentleman commoner of Christ-church, in Oxford; but having before received an impression from the preaching of one Thomas Loe a Quaker, withdrew with some other students from the national worship, and held private meetings, where they preached and prayed amongst themselves. This giving great offence to the heads of the college, Mr Penn, though but 16 years of age, was fined for nonconformity; and continuing his religious exercises, was at length expelled his college. Upon his return home, he was, on the same account, treated with great severity by his father, who at last turned him out of doors; but his resentment afterwards abating, he sent him to France in company with some persons of quality; where he continued a

considerable time, and returned not only well skilled in the French language, but a polite and accomplished gentleman. About the year 1666, his father committed to his care a considerable estate in Ireland. Being found in one of the Quakers meetings in Cork, he, with many others, was thrown into prison; but, on his writing to the earl of Orrery, was soon discharged. However, his father being informed he still adhered to his opinions, sent for him to England, and finding him inflexible to all his arguments, turned him out of doors a second time. About the year 1668, he became a public preacher among the Quakers; and that year was committed close prisoner to the Tower, where he wrote several treatises. Being discharged after seven months imprisonment, he went to Ireland, where he also preached amongst the Quakers. Returning to England, he was in 1670 committed to Newgate, for preaching in Gracechurch-street meeting-house, London; but being tried at the sessions-house in the Old Bailey, he was acquitted. In September the same year, his father died; and being perfectly reconciled to him, left him both his paternal blessing and a plentiful estate. But his persecutions were not yet at an end; for in 1671 he was committed to Newgate for preaching at a meeting in Wheeler-street, London; and during his imprisonment, which continued six months, he also wrote several treatises. After his discharge, he went into Holland and Germany; and in the beginning of the year 1672, married and settled with his family at Rickmansworth in Hertfordshire. The same year he published several pieces; and particularly one against Reeve and Muggleton. In 1677, he again travelled into Holland and Germany in order to propagate his opinions; and had frequent conversations with the princess Elizabeth, daughter to the queen of Bohemia, and sister to the princess Sophia, mother to king Geo. I. In 1681, king Charles II. in consideration of the services of Mr Penn's father, and several debts due to him from the crown at the time of his decease, granted Mr Penn and his heirs the province lying on the west side of the river Delaware in North America, which from thence obtained the name of *Pennsylvania*. Upon this Mr Penn published a brief account of that province, with the king's patent; and proposing an easy purchase of lands, and good terms of settlement for such as were inclined to remove thither, many went over. These having made and improved their plantations to good advantage, the governor, in order to secure the planters from the native Indians, appointed commissioners to purchase the land he had received from the king of the native Indians, and concluded a peace with them. The city of Philadelphia was planned and built; and he himself drew up the fundamental constitutions of Pennsylvania in 24 articles. In 1681, he was elected a member of the Royal Society; and the next year he embarked for Pennsylvania, where he continued about two years, and returned to England in August 1684. Upon the accession of King James to the throne, he was taken into a great degree of favour with his Majesty, which exposed him to the imputation of being a Papist; but from which he fully vindicated himself. However, upon the Revolution, he was examined before the council in 1688, and obliged to give security for his appearance on the first day of next term, which was afterwards continued. He was several times dis-

Penn.

charged

Penn,
Pennatula.

charged and examined; and at length warrants being issued out against him, he was obliged to conceal himself for two or three years. Being at last permitted to appear before the king and council, he represented his innocence so effectually that he was acquitted. In August 1699, he, with his wife and family, embarked for Pennsylvania; whence he returned in 1701, in order to vindicate his proprietary right, which had been attacked during his absence. Upon Queen Anne's accession to the crown, he was in great favour with her, and was often at court. But, in 1707, he was involved in a lawsuit with the executors of a person who had been formerly his steward; and, though many thought him aggrieved, the court of chancery did not think proper to relieve him; upon which account he was obliged to live within the rules of the Fleet for several months, till the matter in dispute was accommodated. He died in 1718.

At one period of his life, Penn lodged in a house in Norfolk-street in the Strand. In the entrance to it he had a peeping-hole, through which he could see any person that came to him. A creditor one day sent in his name, and having been made to wait more than a reasonable time, he knocked for the servant, whom he asked, "Will not thy master see me?" "Friend (answered the servant) he has seen thee, but he does not like thee."

Mr Penn's friendly and pacific manner of treating the Indians produced in them an extraordinary love for him and his people; so that they have maintained a perfect amity with the English in Pennsylvania ever since. He was the greatest bulwark of the Quakers; in whose defence he wrote numberless pieces. Besides the above works, he wrote a great number of others; the most esteemed of which are, 1. His Primitive Christianity revived. 2. His defence of a paper, intitled *Gospel Truths, against the Exceptions of the Bishop of Cork*. 3. His Persuasive to Moderation. 4. His Good Advice to the Church of England, Roman Catholic, and Protestant Dissenter. 5. The Sandy Foundation shaken. 6. No Cross, no Crown. 7. The great Case of Liberty of Conscience debated. 8. The Christian Quaker and his Testimony stated and vindicated. 9. A Discourse of the general Rule of Faith and Practice, and Judge of Controversy. 10. England's Present Interest considered. 11. An Address to Protestants. 12. His Reflections and Maxims. 13. His Advice to his Children. 14. His Rise and Progress of the People called Quakers. 15. A Treatise on Oaths. Most of these have passed several editions, some of them many. The letters between William Penn and Dr Tillotson, and William Penn and William Popple, Esq; together with Penn's letters to the princess Elizabeth of the Rhine, and the countess of Hornes, as also one to his wife on his going to Pennsylvania, are inserted in his works, which were first collected and published in 2 vols folio; and the parts since selected and abridged into 1 vol. folio, are very much and deservedly admired for the good sense they contain.

PENNATULA, or SEA-PEN, in natural history, a genus of zoophyte, which, though it swims about freely in the sea, approaches near to the gorgonia. This genus hath a bone along the middle of the inside, which is its chief support; and this bone re-

ceives the supply of its osseous matter by the same polype mouths that furnish it with nourishment. Linnaeus reckons seven species. The name *zoophytes* under which this genus is ranked, it is well known signifies, that the creature partakes both of the animal and vegetable nature; but some have supposed it to be nothing more but a fucus or sea plant. It is certainly an animal, however, and as such is free or locomotive. Its body generally expands into processes on the upper parts, and these processes or branches are furnished with rows of tubular denticles: they have a polype head proceeding from each tube.

The sea-pen is not a coralline, but distinguished from it by this specific difference, corals, corallines, alcyonia, and all that order of beings, adhere firmly by their bases to submarine substances, but the sea-pen either swims about in the water or floats upon the surface.

The Honourable Dr Coote Molesworth lately sent one of these animals to the ingenious Mr Ellis, the author of many curious papers on the nature of corallines, which was taken in a trawl in 72 fathoms water, near the harbour of Brest in France: the same species are frequently found in the ocean from the coast of Norway to the Mediterranean sea, sometimes at considerable depths, and sometimes floating on the surface. Mr Ellis's description of that sent him by Dr Molesworth is as follows:

Its general appearance greatly resembles that of a quill feather of a bird's wing (see Plate CCCLXXXVIII. fig. 1.); it is about four inches long, and of a reddish colour; along the back there is a groove from the quill part to the extremity of the feathered part, as there is in a pen; the feathered part consists of fins proceeding from the stem, as expressed in the figure. The fins move the animal backward and forward in the water, and are furnished with suckers or mouths armed with filaments, which appear magnified as fig. 2. There is no perforation at the bottom, and therefore Mr Ellis is of opinion, that the exuvia of the animals upon which it feeds are discharged by the same apertures at which the food is taken in; and in this it is not singular, Nature having observed the same economy in the Greenland polype, described by Mr Ellis in his Essay on Corallines. Each sucker has eight filaments, which are protruded when prey is to be caught; but at other times they are drawn back into their cases, which are furnished at the end with *spiculae*, that close together round the entrance, and defend this tender part from external injuries.

Dr Bohadsch of Prague had an opportunity of observing one of these animals alive in the water, and he gives the following account of what he saw: "A portion of the stem contracted, and became of a strong purple colour, so as to have the appearance of a ligature round it; this apparent ligature, or zone, moved upwards and downwards successively through the whole length of the stem, as well the feathered as the naked part; it began at the bottom, and moving upwards to the other extremity, it there disappeared, and at the same instant appeared again at the bottom, and ascended as before; but as it ascended through the feathered or pinnated part, it became paler. When this zone is much constricted, the trunk above it swells, and acquires the form of an onion; the con-

striction

Pennatula

striction of the trunk gives the colour to the zone, for the intermediate parts are paler in proportion as the zone becomes deeper. The end of the naked trunk is sometimes curved like a hook; and at its extremity there is a sinus or chink, which grows deeper while the purple ring is ascending, and shallower as it is coming down. The fins have four motions, upward and downward, and backward and forward, from right to left, and from left to right. The fleshy filaments, or claws, move in all directions; and with the cylindrical part from which they proceed are sometimes protruded from the fins, and sometimes hidden with them.

Upon dissecting this animal the following phenomena were discovered. When the trunk was opened lengthwise, a saltish liquor flowed out of it, so viscid as to hang down an inch. The whole trunk of the stem was found to be hollow, the outward membrane being very strong, and about a tenth part of an inch thick: within this membrane appeared another much thinner; and between these two membranes, in the pinnated part of the trunk, innumerable little yellowish eggs, about the size of a white poppy-seed, were seen floating in a whitish liquor; about three parts of the cavity within the inner membrane is filled by a kind of yellowish bone: this bone is about two inches and an half long, and one twentieth of an inch thick; in the middle it is four square, but towards the ends it grows round and very taper, that end being finest which is next the pinnated part of the trunk. This bone is covered in its whole length with a clear yellowish skin, which at each end runs out into a ligament; one is inserted in the top of the pinnated trunk, and the other in the top of the naked trunk: by the help of the upper ligament the end of the bone is either bent into an arch, or disposed in a straight line. The fins are composed of two skins; the outward one is strong and leathery, and covered over with an infinite number of crimson streaks; the inner skin is thin and transparent: the suckers are also in the same manner composed of two skins, but the outward skin is something softer. Both the fins and suckers are hollow, so that the cavity of the suckers may communicate with those of the fins, as the cavity of the fins does with that of the trunk.

Dr Shaw, in the History of Algiers, says, that these animals are so luminous in the water, that in the night the fishermen discover fishes swimming about in various depths of the sea by the light they give: From this extraordinary quality Linnæus calls this species of the sea-pen, *pennatula phosphorea*, and remarks, after giving the synonymes of other authors, *Habitat in oceano fundum illuminans*.

There are other kinds of sea-pens, or species of this animal, which have not a resemblance to a pen. There is the kidney shaped sea-pen (see fig. 3.), the feather of the peacock fish (see fig. 4.), the pennatula filosa of Linnæus (see fig. 5.), his pennatula sagitta (see fig. 6.), his pennatula mirabilis (see fig. 7.), and the finger-shaped sea-pen (see fig. 8.). The kidney-shaped sea-pen was discovered some time ago on the coast of South Carolina, and sent to Mr Ellis by John Gregg, Esq; of Charlestown. It is of a fine purple colour; the kidney part is about an inch from end to end, and about half an inch wide in the narrowest part; a tail proceeds from the middle of the body, which is roundish, and about an inch long; is also full of rings like

an earth-worm, and along the middle both of the upper and under part of it there is a small groove which runs from one end to the other, but there is no perforation at either extremity. The upper part of the body is convex, and about an inch thick; the whole surface is covered with small yellow starry openings, through which little suckers are protruded, each furnished with six tentacula, or filaments, like what are observed on some corals; the under part of the body is quite flat, and is full of ramifications of fleshy fibres, which proceeding from the insertion of the tail, as a common centre, branch out so as to communicate with the starry openings on the exterior edge and upper surface of the animal. Of all the pennatulæ yet known the feather shaped one, or as it is called the *silver sea-pen* (see fig. 1), is the largest as well as the most specious in its appearance. It is of a beautiful silvery white, elegantly striated on each of the feather-like processes with lines or streaks of the deepest black. It is very rare, and is a native of the Indian seas. There is a very fine specimen of this species in the British Museum.

PENNI (Giovanni Francisco), born at Florence in 1488, was the disciple of Raphael, who observing his genius and integrity, intrusted his domestic concerns entirely to his management; by which means he got the appellation of *il fattore*, or the "steward," which he retained ever after. The genius of Penni was universal; but his greatest pleasure was in painting landscapes and buildings: he was an excellent designer, and coloured extremely well in oil, distemper, and fresco. He painted portraits in an exquisite style; and had such happy natural talents, that Raphael left him heir to his fortune in partnership with Julio Romano his fellow-disciple. After Raphael's death, Penni painted many pictures at Rome, particularly in the palace of Chigi, so exactly in the style of his master, that they might not undeservedly have been imputed to him: he finished, in conjunction with Julio and Pierino del Vaga, the celebrated designs of the battles of Constantine, and others, which Raphael had left imperfect; but differing with them about a copy of the transfiguration, which the pope intended for the king of France, they separated. Penni went to Naples; but the air of that country disagreeing with his constitution, he died soon after in 1528. He had a brother called *Lucca Penni*, who worked at Genoa and other parts of Italy in conjunction with Pierino del Vaga, who married his sister; he went thence to England, where he worked for Henry VIII. and for several merchants; was employed by Francis I. at Fountainbleau; but at last quitted the pencil, and devoted himself to engraving.

PENNY, or PENY, in commerce, an ancient English coin, which had formerly considerable course; but is now generally dwindled into an imaginary money, or money of account. Camden derives the word from the Latin *pecunia*, "money."

The ancient English penny, penig, or pening, was the first silver coin struck in England; nay, and the only one current among our Saxon ancestors: as is agreed by Camden, Spelman, Dr Hicks, &c.

The penny was equal in weight to our three-pence; five of them made one shilling, or scilling Saxon; 30 a mark or mancuse, equal to our 7 s. 6 d.

Till the time of King Edw. I. the penny was struck with a cross, so deeply indented in it, that it might be easily

Penni,
Penny.

Penny.
Penrith.

easily broke, and parted, on occasion, into two parts, thence called *half-pennies*; or into four, thence called *fourthings*, or *farthings*.—But that prince coined it without indenture; in lieu of which, he first struck round halfpence and farthings.

He also reduced the weight of the penny to a standard; ordering that it should weigh 32 grains of wheat, taken out of the middle of the ear.—This penny was called the *penny sterling*.—Twenty of these pence were to weigh an ounce; whence the penny became a weight as well as a coin. See *STERLING* and *PENNY-Weight*.

The penny sterling is now nigh disused as a coin; and scarce subsists, but as a money of account, containing the twelfth part of a shilling, or the 140th part of a pound.

PENNY, in ancient statutes, &c. is used for all silver money. And hence the *ward-penny*, *aver-penny*, *hundred-penny*, *tubing-penny*, and *brothal-penny*.

PENNY-Weight, a Troy weight, containing 24 grains; each grain weighing a grain of wheat gathered out of the middle of the ear, well dried. The name took its rise hence, that this was anciently the weight of one of our ancient silver pennies. See *PENNY*.

Twenty of these penny-weights make an ounce Troy.

PENRITH, an ancient town of the county of Cumberland in England, seated under a hill called *Penrith-Fell*, near the rivers Eamont and Lowther. It is a great thoroughfare for travellers; but has little other trade, except tanning, and a small manufacture of checks. Formerly it had a castle, but it is now in ruins. In the church-yard is a monument of great antiquity, consisting of two stone-pillars 11 feet 6 inches high, and 5 in circumference in the lower part, which is rounded; the upper is square, and tapers to a point; in the square part is some fret-work, and the relievo of a cross; and on the interior side of one is the faint representation of some animal. But these stones are mortised at their lower part into a round one: they are about 15 feet asunder, and the space between them is inclosed on each side with two very large but thin semicircular stones; so that there is left between pillar and pillar a walk of two feet in breadth. Two of these lesser stones are plain, the others have certain figures, at present scarce intelligible. Not far from these pillars is another called the *giant's thumb*, five feet eight inches high, with an expanded head, perforated on both sides; from the middle the stone rises again into a lesser head, rounded at top; but no part has a tendency to the figure of a cross, being in no part mutilated. The pillars are said to have been set up in memory of Sir Owen Cæsarius, a famous warrior buried here, who killed so many wild bears, which much infested this county, that the figures of bears, cut out in stone, on each side of his grave, were set there in remembrance of the execution he made among those beasts; and it is likewise said his body extended from one pillar to the other. In the market-place there is a town-house of wood, beautified with bears climbing up a ragged staff. There is a memorandum on the north side of the vestry without, that, in 1598, 2266 persons died here of the plague. There is a charity-school in this place for 20 boys, and another for 30 girls, maintained by 55 l. a year, by the sacrament-money and parish-stock. In 1715 the Scotch

Highlanders entered this town, and quartered in it for a night, in their way to Preston, without doing much harm; but in the last rebellion, in 1745, they were, it is said, very rapacious and cruel. Its handsome spacious church has been lately rebuilt, and the roof supported by pillars, whose shafts are of one entire reddish stone, dug out of a neighbouring quarry. On the east part of the parish, upon the north bank of the river Eamont, there are two caves or grottoes, dug out of the solid rock, and sufficient to contain 100 men. The passage to them is very narrow and dangerous; and it is possible that its perilous access may have given it the name of *Ifis Parlus*; though the vulgar tell strange stories of one Ifis, a giant, who lived there in former times, and, like Cacus of old, used to seize men and cattle, and draw them into his den to devour them. But it is highly probable, that these subterraneous chambers were made for a secure retreat in time of sudden danger; and the iron gates, which were taken away not long ago, seem to confirm that supposition. W. Long. 3. 16. N. Lat. 54. 35.

PENROSE (Thomas), was the son of the Reverend Mr Penrose, rector of Newbury, Berks, a man of high character and abilities, descended from an ancient Cornish family, beloved and respected by all who knew him. Mr Penrose, jun. being intended for the church, pursued his studies with success, at Christchurch, Oxon, until the summer of 1762, when his eager turn to the naval and military line overpowering his attachment to his real interest, he left his college, and embarked in the unfortunate expedition against Nova Colonia, in South America, under the command of Captain Macnamara. The issue was fatal. The Clive (the largest vessel) was burnt; and though the Ambuscade escaped (on board of which Mr Penrose, acting as lieutenant of marines, was wounded), yet the hardships which he afterwards sustained in a prize sloop, in which he was stationed, utterly ruined his constitution. Returning to England with ample testimonials of his gallantry and good behaviour, he finished, at Hertford College, Oxon, his course of studies; and having taken orders, accepted the curacy of Newbury, the income of which, by the voluntary subscription of the inhabitants, was considerably augmented. After he had continued in that station about nine years, it seemed as if the clouds of disappointment, which had hitherto overshadowed his prospects, and tinged his poetical essays with gloom, were clearing away; for he was then presented by a friend, who knew his worth and honoured his abilities, to a living worth near 500 l. *per annum*. It came, however, too late; for the state of Mr Penrose's health was now such as left little hope, except in the assistance of the waters of Bristol. Thither he went; and there he died in 1779, aged 36 years. In 1768 he married Miss Mary Slocock of Newbury, by whom he had one child, Thomas, who was educated at Winton College.

Mr Penrose was respected for his extensive erudition, admired for his eloquence, and equally beloved and esteemed for his social qualities. By the poor, towards whom he was liberal to his utmost ability, he was venerated to the highest degree. In oratory and composition his talents were great. His pencil was ready as his pen, and on subjects of humour had uncommon merit. To his poetical abilities the public, by their recep-

Penrose.

Penryn,
Pensacola.

reception of his *Flights of Fancy*, &c. have given a favourable testimony. To sum up the whole, his figure and address were as pleasing as his mind was ornamented.

PENRYN, a town of Cornwall, in England, seated on a hill at the entrance of Falmouth-haven by Pendennis castle. It consists of about 300 houses; and the streets are broad and well paved. There are so many gardens and orchards in it, that it resembles very much a town in a wood. It is well watered with rivulets, and has an arm of the sea on each side of it, with a good customhouse and quay, and other neat buildings. It drives a considerable trade in pilchards, and in the Newfoundland fishery. It was anciently governed by a portreeve; but James I. made it a corporation, consisting of a mayor, 11 aldermen, 12 common-councilmen, with a recorder, steward, &c. an office of record every three weeks, with a prison, and power to try felons in their jurisdiction. And he granted, that the mayor and two aldermen should be justices of the peace, and that they should have a guildhall. There was once a monastery in this place, which was a cell to Kirton; and there are still to be seen a tower, and part of the garden walls, the ruins of a collegiate church. It has neither church nor chapel, but belongs to the parish of Gluvias, a quarter of a mile off. It has sent members to parliament ever since the first year of Queen Mary; and James II. granted it a new charter, whereby their election was vested in the magistracy only; but it was never made use of, all the inhabitants that pay scot and lot, who are not much above 100, being the electors. Mr Rymer gives a very remarkable account how Penryn was once saved by a company of strolling players. He says, that towards the latter end of the 16th century the Spaniards were landing to burn the town just as the players were setting Samson upon the Philistines; which performance was accompanied with such drumming and shouting, that the Spaniards thought some ambush was laid for them, and scampered back to their ships. Queen Elizabeth founded a free-school in this place. W. Long. 5. 35. N. Lat. 50. 23.

PENSACOLA, a settlement in North America, situated at the mouth of a river on the gulf of Mexico. It was established by the French, and ceded to Great Britain in 1763. Its first discoverer was Sebastian Cabot in 1497.

The year 1781, so disastrous to Britain in other respects, was also remarkable for the reduction of Pensacola by the Spaniards under Don Bernardo Galvez. Great preparations for this expedition had been making at the Havannah; but it was for some time retarded by a dreadful hurricane which attacked the Spanish fleet, and by which four ships of the line, besides others of inferior note, were lost, together with the people on board, to the amount of more than 2000. By this disaster the remainder were obliged to put back to the Havannah to repair; but as soon as the fleet was again judged capable of putting to sea, an embarkation was made of near 8000 men, with Don Bernardo at their head, together with five ships of the line, who arrived at Pensacola on the 9th of March 1781. This force was soon augmented by ten ships of the line and six frigates; while General Campbell, the British governor, could oppose such a formidable

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armament with few more than 1000 men, consisting of some regulars and seamen, with the inhabitants. The entrance of the harbour, which was the principal object of defence, was guarded by two small armed vessels, but they were insufficient to second the batteries that had been erected for its protection; and these, without the assistance of some ships of force, were incapable of resisting a vigorous attack. Notwithstanding this prodigious odds, however, the Spaniards met with the most determined opposition. Every inch of ground was disputed with the greatest resolution. The harbour was not forced without the greatest difficulty, nor could the vessels be taken that defended it; the companies belonging to them, after setting them on fire, retired on shore.

The Spaniards, now in possession of the harbour, invested the place in form, and made their approaches in a cautious and regular manner; while, on the other hand, the besieged were no less active and vigilant in their own defence. Sallies were made occasionally with great success, at the same time that an uninterrupted fire was kept up in such a manner as not only greatly to annoy, but even to strike the besiegers with astonishment. This incensed the Spanish general the more, as he knew that the garrison could expect no relief, and therefore that all their efforts could only prolong the date of their surrender. The resistance was the more mortifying, as he was perfectly conscious of the bravery of his troops; and he had artillery fit, as his officers expressed themselves, "to be employed against Gibraltar." With all these advantages, however, so resolute was the defence of the garrison, that after the siege had continued for two months, very little hope could be entertained of its speedy termination. As they despaired therefore of making any effectual impression by means of their cannon, they erected a battery of mortars, with which they bombarded a redoubt that commanded the main avenue to the place; and in this they were favoured by an unexpected accident. On the 8th of May a shell burst open the door of the powder magazine under the redoubt, by which it was blown up, with the loss of near 100 men killed and wounded. Fortunately for the garrison, however, two flank-works still remained entire, from both which so heavy a fire was kept up, that though an assault was immediately given, the assailants were repulsed with great slaughter. This afforded leisure to the garrison to carry off the wounded men, with some of the artillery, and to spike up the rest. As the enemy, however, soon recovered themselves, and prepared for a general storm, it was thought proper to abandon the flank works, and retire into the body of the place. The possession of these outworks, however, gave the enemy such advantages, that the place was no longer tenable. Their situation, on a rising ground, enabled them to command the battery opposite to their chief approach with small arms, and to single out the men at their guns. A capitulation therefore became absolutely necessary, which was obtained on honourable terms. The town, with the whole province of West Florida, was confirmed to the Spaniards by the treaty of 1783. W. Long. 87. 20. N. Lat. 30. 22.

PENSANCE, a town of Cornwall, in England, at the bottom of Mounts Bay, about ten miles from the Land's End. It was burnt in 1595 by the Spaniards,

R

who,

Pensacola,
Pensance.

Pensiles,
Pensilvania.

who, with four galleys, surprised this part of the coast, and set fire to several villages and farms: but it was soon after rebuilt, made one of the coinage towns, and has now a considerable trade. It lies in the parish of Madern, noted for its restorative spring, very effectual in the cure of lameness as well as the cholic, &c. It is well-built and populous, and has many ships belonging to it. The shore abounds so with lead, tin, and copper ore, that the veins thereof appear on the utmost extent of land at low-water mark.

PENSILES HORTI, *Hanging Gardens*, in antiquity. See BABYLON, n^o 5.

PENSILVANIA, late one of the principal British colonies in North America, had its name from the famous Quaker William Penn, son of Sir William, commander of the English fleet in Oliver Cromwell's time, and in the beginning of Ch. II.'s reign, who obtained a grant of it in the year 1679; is bounded on the east by Delaware bay and river, and the Atlantic ocean; on the north by the country of the Iroquois, or five nations; and on the south and west by Maryland. Its extent from north to south is about 200 miles; but its breadth varies greatly, from 15, and even less, to near 200.

The air in Pensilvania is sweet and clear. The fall, or autumn, begins about the 20th of October, and lasts till the beginning of December, when the winter sets in, which continues till March, and is sometimes extremely cold and severe; but the air is then generally dry and healthy. The river Delaware, though very broad, is often frozen over. From March to June, that is, in the spring, the weather is more inconstant than in the other seasons. In the months of July, August, and September, the heats would be almost intolerable, if they were not mitigated by frequent cool breezes. The wind during the summer is generally south-west; but in the winter blows for the most part from the north-west, over the snowy frozen mountains and lakes of Canada, which occasions the excessive cold during that season. On the whole, the climate of this state differs not materially from that of Connecticut, except that on the west side of the mountains the weather is much more regular. The inhabitants never feel those quick transitions from cold to heat, by a change of the wind from north to south, as those so frequently experience who live eastward of the mountains and near the sea. The hot southwardly winds get chilled by passing over the long chain of Allegany mountains.

Longevity, when tolerably ascertained, is doubtless the truest mark of the healthiness of any country; but this state, which has not been settled above 100 years, is not sufficiently old to determine from facts the state of longevity. Among the people called Quakers, who are the oldest settlers, there are instances of longevity, occasioned by their living in the old cultivated counties, and the temperance imposed on them by their religion. There are fewer long-lived people among the Germans than among other nations, occasioned by their excess of labour and low diet. They live chiefly upon vegetables and watery food, that affords too little nourishment to repair the waste of their strength by hard labour. Nearly one half of the children born in Philadelphia die under two years of age, and chiefly

with a disease in the stomach and bowels. Very few *Pensilvania.* die at this age in the country.

As to the face of this country, towards the coast, like the adjacent colonies, it is flat, but rises gradually to the Apalachian mountains on the west. As much as nearly one third of this state may be called mountainous; particularly the counties of Bedford, Huntingdon, Cumberland, part of Franklin, Dauphin, and part of Bucks and Northampton, through which pass, under various names, the numerous ridges and spurs, which collectively form what we choose to call, for the sake of clearness, *the great range of Allegany mountains*. There is a remarkable difference between the country on the east and west side of the range of mountains we have just been describing. Between these mountains and the lower falls of the rivers which run into the Atlantic, not only in this, but in all the southern states, are several ranges of stones, sand, earths, and minerals, which lie in the utmost confusion. Beds of stone, of vast extent, particularly of limestone, have their several layers broken in pieces, and the fragments thrown confusedly in every direction. Between these lower falls and the ocean is a very extensive collection of sand, clay, mud, and shells, partly thrown up by the waves of the sea, partly brought down by floods from the upper country, and partly produced by the decay of vegetable substances. The country westward of the Allegany mountains, in these respects, is totally different. It is very irregular, broken, and variegated, but there are no mountains; and when viewed from the most western ridge of the Allegany, it appears to be a vast extended plain. All the various strata of stone appear to have lain undisturbed in the situation wherein they were first formed. The layers of clay, sand, and coal, are nearly horizontal. Scarcely a single instance is to be found to the contrary. Every appearance, in short, tends to confirm the opinion, that the original crust, in which the stone was formed, has never been broken up on the west side of the mountains, as it evidently has been eastward of them.

The chief rivers are three, Delaware, Susquehanna, and Skookil. The Delaware, rising in the country of the Iroquois, takes its course southward; and after dividing this province from that of New Jersey, falls into the Atlantic ocean between the promontories or capes May and Henlopen, forming at its mouth a large bay, called from the river *Delaware Bay*. This river is navigable above 200 miles. The Susquehanna rises also in the country of the Iroquois, and running south through the middle of the province, falls into the bay of Chesapeake, being navigable a great way for large ships. The Skookil has its source in the same country as the other two, and also runs south, almost parallel to them; till at length, turning to the eastward, it falls into the Delaware at the city of Philadelphia. It is navigable for boats above 100 miles. These rivers, with the numerous creeks and harbours in Delaware bay, capable of containing the largest fleets, are extremely favourable to the trade of this province.

As to the soil, produce, and traffic of Pensilvania, we refer the reader to the articles NEW-YORK and the JERSEYS, since what is there said on those heads is equally applicable to this province; and if there is any difference, it is on the side of this province. They have

Pennsylvania. have some rice here, but in no great quantities; and some tobacco, but it is not equal to that of Virginia. From the premiums offered by the society of arts in London, it appears that the soil and climate of this province are looked upon as proper for the cultivation of some species of vines. The trade carried on from hence and the other colonies to the French and Dutch islands and Surinam, was greatly to the disadvantage of Britain, and very destructive to the sugar-colonies: for they take molasses, rum, and other spirits, with a great many European goods, from these foreigners; carrying them horses, provisions, and lumber in return; without which the French could not carry on their sugar-manufactures to that advantage they do.

New York, the Jerseys, and *Pennsylvania*, were discovered, with the rest of the continent of North America, in the reign of Henry VII. by Sebastian Cabot, for the crown of England; but Sir Walter Raleigh was the first adventurer that attempted to plant colonies on these shores, in the reign of Queen Elizabeth; and, in honour of that princess, gave all the eastern coast of North America the name of *Virginia*. Mr Hudson, an Englishman, sailing to that part of the coast which lies between Virginia and New England, in the beginning of the reign of James I. and being about to make a settlement at the mouth of Hudson's river, the Dutch gave him a sum of money to dispose of his interest in this country to them. In the year 1608 they began to plant it; and, by virtue of this purchase, laid claim to all those countries which are now denominated *New York*, *New Jersey*, and *Pennsylvania*; but there remaining some part of this coast which was not planted by the Hollanders, the Swedes sent a fleet of ships thither, and took possession of it for that crown; but the Dutch having a superior force in the neighbourhood, compelled the Swedes to submit to their dominion, allowing them, however, to enjoy the plantations they had settled. The English not admitting that either the Dutch or Swedes had any right to countries first discovered and planted by a subject of England, and part of them at that time possessed by the subjects of Great Britain, under charter from Queen Elizabeth and King James I. King Charles II. during the first Dutch war in 1664, granted the countries of New York, the Jerseys, and *Pennsylvania*, of which the Dutch had usurped the possession, to his brother James Duke of York; and Sir Robert Carr being sent over with a squadron of men of war and land forces, and summoning the Dutch governor of the city of New Amsterdam, now New York, to surrender, he thought fit to obey the summons, and yield that capital to the English: the rest of the places in the possession of the Dutch and Swedes followed his example; and these countries were confirmed to the English by the Dutch at the next treaty of peace between the two nations. The Duke of York afterwards parcelled them out to under proprietors; selling, in particular, to William Penn the elder, in 1683, the town of Newcastle, *alias* Delaware, and a district of 12 miles round the same; to whom, his heirs and assigns, by another deed of the same date, he made over all that tract of land from 12 miles south of Newcastle to the Whore-hills, otherwise called *Cape Henlopen*, now divided into the two counties of Kent and Sussex, which, with Newcastle district, are com-

monly known by the name of the *Three Lower Counties upon Delaware River*. All the rest of the under-proprietors, some time after, surrendered their charters to the crown; whereby New York and the Jerseys became royal governments; but Penn retained that part of the country which had been sold to him by the Duke of York, together with what had been granted to him before in 1680-1, which now constitutes the province of *Pennsylvania*. As soon as Penn had got his patent, he began to plant the country. Those who went over from England were generally Dissenters and Quakers, whose religion is established by law here, but with a toleration of all other Protestant sects. The Dutch and Swedes, who were settled here before Mr Penn became proprietor, choosing still to reside in this country, as they did in New York and the Jerseys, obtained the same privileges as the rest of his majesty's subjects; and their descendants are now in a manner the same people with the English, speaking their language, and being governed by their laws and customs. Mr Penn, however, not satisfied with the title granted him by King Charles II. and his brother, bought the lands also of the Indians for a valuable consideration, or what they esteemed such (though 20 miles were purchased, at first, for less than an acre about Philadelphia would pay now), paying them in cloth, tools, and utensils, to their entire satisfaction; for they had not hands to cultivate the hundredth part of their lands, and if they could have raised a product, there was nobody to buy: the purchase, therefore, was all clear gain to them; and, by the coming of the English, their paltry trade became so profitable, that they soon found their condition much altered for the better; and are now as well clothed and fed as the European peasantry in many places.

Pennsylvania is one of the most flourishing colonies in North America, having never had any quarrel with the natives. Whenever they desire to extend their settlements, they purchase new lands of the sachems, never taking any by force; but the Indians now set a very high price upon their lands, in comparison of what they did at first, and will hardly part with them at any rate. In an estimate of the proprietary estate of the province, published above 40 years ago, we find, that the proprietaries, who alone can purchase lands here from the natives, had bought seven millions of acres for no more than 750*l.* sterling, which the proprietaries afterwards sold at the rate of 15*l.* for every 100 acres. The Indian council at Onondago, however, disapproved of their deputies parting with so much land; and, in the year 1755, obliged the proprietaries to reconvey great part of the same to the Indians.

A dispute subsisted a long time between the proprietaries of this province and Lord Baltimore, proprietary of Maryland, about the right to certain lands; which was at last amicably adjusted, though greatly in favour of the Penns.

About the year 1704 there happened some alteration in the constitution of the province. The establishment that took place, and subsisted till the American war broke out, consisted of a governor, council, and assembly, each with much the same power and privileges as in the neighbouring colony of New York. The lieutenant governor and council were appointed

Pennsylvania. by the proprietors Thomas and Richard Penn, with his majesty's approbation; but if the laws enacted here were not repealed within six months after they had been presented to the king for his approbation or disallowance, they were not repealable by the crown after that time.

By the present constitution of Pennsylvania, which was established in September 1776, all legislative powers are lodged in a single body of men, which is styled, *The general assembly of representatives of the freemen of Pennsylvania*. The qualification required to render a person eligible to this assembly is, two years residence in the city or county for which he is chosen. The qualifications of the electors are, full age, and one year's residence in the state, with payment of public taxes during that time. But the sons of freeholders are intitled to vote for representatives, without any qualification except full age. No man can be elected as a member of the assembly more than four years in seven. The representatives are chosen annually on the second Tuesday in October, and they meet on the fourth Monday of the same month. The supreme executive power is lodged in a president, and a council consisting of a member from each county. The president is elected annually by the joint ballot of the assembly and council, and from the members of council. A vice-president is chosen at the same time. The counsellors are chosen by the freemen every third year; and having served three years, they are ineligible for the four succeeding years. The appointments of one-third only of the members expire every year; by which rotation no more than one third can be new members.

With respect to population, Morse informs us, that in 1787 the inhabitants in Pennsylvania were reckoned at 360,000. It is probable they are now more numerous, perhaps 400,000. If we fix them at this, the population for every square mile will be only nine; by which it appears that Pennsylvania is only one fifth as populous as Connecticut. But Connecticut was settled nearly half a century before Pennsylvania; so that in order to do justice to Pennsylvania in the comparison, we must anticipate her probable population 50 years hence. These inhabitants consist of emigrants from England, Ireland, Germany, and Scotland. The Friends and Episcopalians are chiefly of English extraction, and compose about one third of the inhabitants. They live principally in the city of Philadelphia, and in the counties of Chester, Philadelphia, Bucks, and Montgomery. The Irish are mostly Presbyterians. Their ancestors came from the north of Ireland, which was originally settled from Scotland; hence they have sometimes been called Scotch Irish, to denote their double descent. But they are commonly and more properly called Irish, or the descendants of people from the north of Ireland. They inhabit the western and frontier counties, and are numerous. The Germans compose one quarter at least, if not a third, of the inhabitants of Pennsylvania. They inhabit the north parts of the city of Philadelphia, and the counties of Philadelphia, Montgomery, Bucks, Dauphin, Lancaster, York, and Northampton; mostly in the four last. They consist of Lutherans (who are the most numerous sect), Calvinists, Moravians, Menonists, Tunkers (corruptly called Dunkers), and Swing-

felters, who are a species of Quakers. These are all Pennsylvania distinguished for their temperance, industry, and economy. The Germans have usually 15 of 69 members in the assembly: and some of them have arisen to the first honours in the state, and now fill a number of the higher offices. Yet the lower class are very ignorant and superstitious. It is not uncommon to see them going to market with a little bag of salt tied to their horses manes, for the purpose, they say, of keeping off the witches.

The Baptists (except the Menonist and Tunker Baptists, who are Germans) are chiefly the descendants of emigrants from Wales, and are not numerous. A proportionate assemblage of the national prejudices, the manners, customs, religions, and political sentiments of all these, will form the Pennsylvania character. As the leading traits in this character, thus constituted, we may venture to mention industry, frugality bordering in some instances on parsimony, enterprise, a taste and ability for improvements in mechanics, in manufactures, in agriculture, in commerce, and in the liberal sciences; temperance, plainness, and simplicity in dress and manners: pride and humility in their extremes; inoffensiveness and intrigue; in regard to religion, variety and harmony; liberality, and its opposites, superstition and bigotry; and in politics an unhappy jargon. Such appear to be the distinguishing traits in the collective Pennsylvanian character.

Of the great variety of religious denominations in Pennsylvania, the Friends or Quakers are the most numerous. They were the first settlers of Pennsylvania in 1682 under William Penn, and have ever since flourished in the free enjoyment of their religion. They neither give titles nor use compliments in their conversation or writings, believing that *whatsoever is more than yea, yea, and nay, nay, cometh of evil*. They conscientiously avoid, as unlawful, kneeling, bowing, or uncovering the head to any person. They discard all superfluities in dress or equipage; all games, sports, and plays, as unbecoming the Christian. *Swear not at all*, is an article of their creed literally observed in its utmost extent. They believe it unlawful to fight in any case whatever; and think that if their enemy *smite them on the one cheek, they ought to turn to him the other also*. They are generally honest, punctual, and even punctilious in their dealings; provident for the necessities of their poor; friends to humanity, and of course enemies to slavery; strict in their discipline; careful in the observance even of the punctilios in dress, speech, and manners, which their religion enjoins; faithful in the education of their children; industrious in their several occupations. In short, whatever peculiarities and mistakes those of other denominations have supposed they have fallen into, in point of religious doctrines, they have proved themselves to be good citizens. Next to the Quakers, the Presbyterians are the most numerous. There are upwards of 60 ministers of the Lutheran and Calvinist religion, who are of German extraction, now in this state; all of whom have one or more congregations under their care; and many of them preach in splendid and expensive churches; and yet the first Lutheran minister, who arrived in Pennsylvania about 40 years ago, was alive in 1787, and probably is still, as was also the second Calvinistical minister.

Pavo cristatus,
or Peacock.



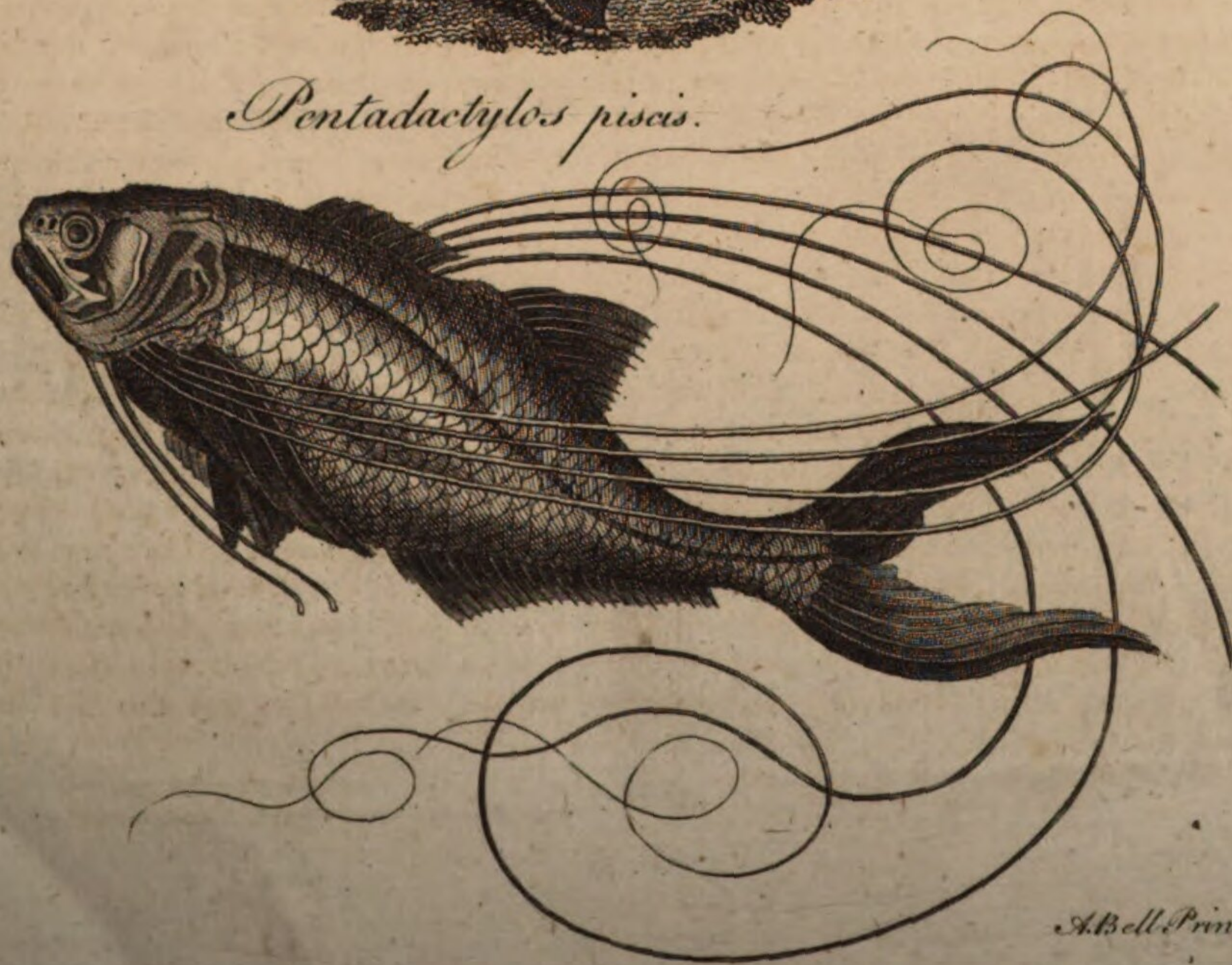
Penelope,
or horned pheasant.



Pelecanus.



Pentadactylos piscis.



Pensilvania. minister. The Lutherans do not differ in any thing essential from the Episcopalians, nor do the Calvinists from the Presbyterians.

The Moravians are of German extraction. Of this religion there are about 1300 souls in *Pensilvania*, viz. between 500 and 600 in Bethlehem, 450 in Nazareth, and upwards of 300 at Litiz in Lancaster county. They call themselves the *United Brethren of the Protestant Episcopal church*. They are called *Moravians*, because the first settlers in the English dominions were chiefly migrants from Moravia. See HERNHUTTERS, and *UNITAS Fratrum*; and for the Mennonites, see MENNONITES. They were introduced into America by Count Zinzendorf, and settled at Bethlehem, which is their principal settlement in America, as early as 1741. For the Tunkers, see TUNKERS.

There are a great many literary, humane, and other useful societies, in *Pensilvania*; more, it is said, than in any of the United Provinces. There are several universities and colleges at Philadelphia and other places: See PHILADELPHIA. Lancaster, Carlisle, and Pittsburgh, are the chief towns after Philadelphia.

Pensilvania is divided into seven counties; four of which are called the *Upper* and three the *Lower*. Of the upper, viz. Buckingham, Philadelphia, Chester, and Lancaster, the three first are the lands included in King Charles II.'s grant, and designed *Pensilvania*; the lower, viz. those of Newcastle, Kent, and Sussex, were called *Nova Belgia* before the duke of York sold them, as we observed above, to Mr Penn. The upper counties end at Marcus Hook, four miles below Chester town, where the lower begin, and run along the coast near 100 miles. Each of these counties had a sheriff, with a quarterly and monthly session, and assizes twice a year.

In the Philosophical Transactions for 1757, there is an account of a copper spring in *Pensilvania*. This spring rises from a copper mine, and will dissolve iron in less time by three-fourths than the waters of Wicklow in Ireland, lately described by Dr William Henry and Dr Bond. From the solution of iron in these waters, about half the quantity of pure copper is procured by melting it in a crucible: but though these waters melt iron sooner than the Irish waters, yet the solution does not produce so great a proportion of copper; for the pure copper procured from the solution of iron in the Irish waters is to the solution as 16 to 20. In the neighbourhood of this spring, which supplies 800 hhds. in 24 hours, are many ores of vitriol and sulphur; the water is of a pale green colour, of an acid, sweet, austere, inky, and nauseous taste. It is very heavy; for the hydrometer, which was immersed in it, stood at the same height as in a solution of one ounce six drams of English vitriol in a quart of water. A very small quantity of the solution of pot ashes instantly precipitates the metallic parts of this water in three different colours; ochre at the top, green in the middle, and white at bottom; a clean knife kept in it a few minutes, is covered with a bright copper colour. But besides a large proportion of copper, this water contains also a large proportion of vitriol of iron. A pint of it exhaled by a slow fire left 400 grains of solid contents, which appeared to be chiefly saline; for 196 grains of it, dissolved and filtered, did not leave above

four grains of indissoluble matter. It appears therefore, that the proportion of vitriolic parts in this water is six drams to a pint; consequently it is a stronger solution of vitriol than sea-water is of marine salt. So that, besides the copper to be obtained by a solution of iron, it will afford great quantities of vitriol, and the great plenty both of water and fuel will make the establishment of a copperas work extremely cheap and commodious. This water mixed with common water is frequently used as an emetic and cathartic by the country people, and is found very efficacious in the cure of cutaneous disorders and sore eyes.

Amongst the other curiosities of this province may be reckoned another spring about 14 feet deep and about 100 square, in the neighbourhood of Reading. A full mill stream issues from it. The waters are clear and full of fishes. From appearances it is probable that this spring is the opening or outlet of a very considerable river, which a mile and an half or two miles above this place sinks into the earth, and is conveyed to this outlet in a subterranean channel. In the northern parts of *Pensilvania* there is a creek called *Oil creek*, which empties into the Allegany river. It issues from a spring, on the top of which floats an oil similar to that called Barbadoes tar, and from which one man may gather several gallons in a day. The troops sent to guard the western posts halted at this spring, collected some of the oil, and bathed their joints with it. This gave them great relief from the rheumatic complaints with which they were affected. The waters, of which the troops drank freely, operated as a gentle purge.

There are three remarkable grottoes or caves in this state: one near Carlisle, in Cumberland county; one in the township of Durham, in Buck's county; and the other at Swetara, in Lancaster county. Of the two former there are no particular descriptions. The latter is on the east bank of Swetara river, about two miles above its confluence with the Susquehannah. Its entrance is spacious, and descends so much as that the surface of the river is rather higher than the bottom of the cave. The vault of this cave is of solid limestone rock, perhaps 20 feet thick. It contains several apartments, some of them very high and spacious. The water is incessantly percolating through the roof, and falls in drops to the bottom of the cave. These drops petrify as they fall, and have gradually formed solid pillars, which appear as supports to the roof. Thirty years ago there were ten such pillars, each six inches in diameter, and six feet high; all so ranged that the place they inclosed resembled a sanctuary in a Roman church. No royal throne ever exhibited more grandeur than this *lufus naturæ*. The resemblances of several monuments are found indented in the walls on the sides of the cave, which appear like the tombs of departed heroes. Suspended from the roof is *the bell* (which is nothing more than a stone projected in an unusual form), so called from the sound that it occasions when struck, which is similar to that of a bell. Some of the stalactites are of a colour like sugarcandy, and others resemble loaf sugar; but their beauty is much defaced by the country people. The water, which percolates through the roof, so much of it as is not petrified in its course, runs down the declivity, and

Pension
||
Pensioner.

and is both pleasant and wholesome to drink. There are several holes in the bottom of the cave, descending perpendicularly, perhaps into an abyss below, which renders it dangerous to walk without a light. At the end of the cave is a pretty brook, which, after a short course, loses itself among the rocks. Beyond this brook is an outlet from the cave by a very narrow aperture. Through this the vapours continually pass outwards with a strong current of air, and ascend, resembling at night the smoke of a furnace. Part of these vapours and fogs appear on ascending to be condensed at the head of this great alembic, and the more volatile parts to be carried off, through the aperture communicating with the exterior air before mentioned, by the force of the air in its passage.

PENSION, a sum of money paid annually for services or considerations already past. The yearly payment of each member to the houses of the inns of courts are likewise named *pensions*; and the yearly assembly of the society of Gray's Inn, to consult on the affairs of the house, is also called a *pension*.

PENSIONARY, or PENSIONER, a person who has an appointment or yearly sum, payable during life, by way of acknowledgment, charged on the estate of a prince, company, or particular person.

Grand PENSIONARY, an appellation given to the first minister of the States of Holland. The grand pensionary is chairman in the assemblies of the states of that province: he proposes the matters to be consulted on; collects the votes; forms and pronounces the resolutions of the states; opens letters; confers with foreign ministers, &c. His business is also to inspect the finances, to maintain the authority of the states, and to see that the laws are observed; and he is perpetual deputy of the states general of the United Provinces. His commission is, however, given him only for five years; after which it is deliberated whether or not it shall be renewed; but there is no instance of its being revoked; therefore death only puts an end to the functions of this important minister.

PENSIONARY, is also the first minister of the regency of each city in Holland. His office is to give his advice in affairs relating to the government, either of the state in general, or of the city in particular; and in assemblies of the states of the province, he is speaker in behalf of his city. The function, however, of these pensionaries is not everywhere alike; in some cities they only give their advice, and are never found in assemblies of the magistrates, except when expressly called thither: in others they attend constantly; and in others they make the propositions on the part of the burgomasters, draw up their conclusions, &c. They are called *pensionaries*, because they receive an appointment or pension.

PENSIONER, in general, denotes a person who receives a pension, yearly salary, or allowance. Hence

The Band of Gentlemen PENSIONERS, the noblest sort of guard to the king's person, consists of 40 gentlemen, who receive a yearly pension of 100 l.

This honourable band was first instituted by King Henry VIII. and their office is to attend the king's person, with their battle-axes, to and from his chapel-royal, and to receive him in the presence-chamber, or coming out of his privy-lodgings; they are also to attend at all great solemnities, as coronations, St George's

feast, public audiences of ambassadors, at the sovereign's going to parliament, &c.

They are each obliged to keep three double horses and a servant, and so are properly a troop of horse. They wait half at a time quarterly; but on Christmas-day, Easter-day, Whitsunday, &c. and on extraordinary occasions, they are all obliged to give their attendance. They have likewise the honour to carry up the sovereign's dinner on the coronation-day and St George's feast; at which times the king or queen usually confer the honour of knighthood on two such gentlemen of the band as their captain presents.

Their arms are gilt battle-axes; and their weapons, on horseback, in time of war, are cuirassiers-arms, with sword and pistols. Their standard in time of war is, argent, a cross gules. Their captain is always a nobleman, who has under him a lieutenant, a standard-bearer, a clerk of the check, secretary, paymaster, and harbinger.

PENSIONER, in the university of Cambridge and in that of Dublin, has a very peculiar meaning; for those students, either under-graduates or bachelors of arts, are called *pensioners* who live wholly at their own expence, and who receive no emolument whatever from the college of which they are members. They are divided into two kinds, the *greater* and the *less*; the former of which are generally called *fellow-commoners*, because they eat with the fellows of their college; the latter are always called *pensioners*, and eat with the scholars, who are those students of the college, either under-graduates or bachelors who are upon the foundation, who receive emoluments from the society, and who are capable of being elected fellows. See SERVITOR and SIZAR.

PENSTOCK, a sluice or flood-gate, serving to retain or let go at pleasure the water of a mill-pond, or the like.

PENTACEROS, in natural history, a name given by Linkius and some other authors to a kind of *Stella marina* or sea star-fish, composed of five principal rays, with several transverse hairy or downy processes.

PENTACHORD (compounded of *πεντε* five, and *χορδή* string), an ancient musical instrument with five strings. The invention of the pentachord is referred to the Scythians; the strings were of bullock's leather, and they were struck with a plectrum made of goats horn.

PENTACROSTIC, in poetry, a set of verses so disposed, as that there are always five acrostics of the same name, in five divisions of each verse. See ACROSTIC.

PENTACTINODOS, in natural history, a name given by some authors to those species of star-fish which are composed of a body divided into five rays.

PENTADACTYLON, FIVE FINGERS, in botany, a name given by some authors to the *ricinus* or *palma Christi*, from the figure of its leaf.

PENTADACTYLOS PISCIS, the *five-fingered fish*, Plate in ichthyology, the name of a fish common in all the seas about the East Indies, and called by the Dutch there *vijs vinger visch*. cccclxxi.

It has this name from five black streaks which it has on each side, resembling the prints of five fingers. Its head is flat, convex at the bottom, plain in the sides, and inclined in the fore-part. The snout is thick, obtuse, and round; the lower jaw at its extremity bent and

Pensioner
||
Pentadactylos.

Pentædro- and rounded; the nostrils are double; the balls of the
styla eyes oval; the iris of a silver colour; the first fin of
the back is small, the second is more elevated; those of
the breast are inserted obliquely, that of the anus is
greatly extended, and that of the tail much sloped. The whole body is covered with scales of a moderate size, thin, flexible, and slightly indented on their hinder edge; the back is reddish, the sides of a silver colour, and the fins white. The fish is described by some as about nine inches long; by others as a foot and a half. It is a dry but not ill-tasted fish.

PENTÆDROSTYLA, in natural history, the name of a genus of spars: (See SPAR). The bodies of this genus are spars in form of pentagonal columns, terminated by pentangular pyramids at one end, and regularly affixed at the other to some solid body.

PENTAGON, in geometry, a figure of five sides and five angles. See GEOMETRY.

In fortification, pentagon denotes a fort with five bastions.

PENTAGONOTHECA, in botany, the name given by Vaillant to the plant called by Linnæus, Plumier, Houston, and others, *pisonia*.

PENTAGRAPH, an instrument designed for drawing figures in what proportion you please, without any skill in the art.

The instrument is otherwise called a *parallelogram*. The common pentagraph (Plate CCCLXXXIII. fig. 14.) consists of four brass or wooden rulers, two of them from 15 to 18 inches long, the other two half that length. At the ends, and in the middle, of the longer rulers, as also at the ends of the shorter, are holes, upon the exact fixing whereof the perfection of the instrument chiefly depends. Those in the middle of the long rulers are to be at the same distance from those at the end of the long ones and those of the short ones; so that when put together they may always make a parallelogram.

The instrument is fitted together for use by several little pieces, particularly a little pillar, N° 1. having at one end a screw and nut, whereby the two long rulers are joined; and at the other a little knot for the instrument to slide on. The piece, N° 2. is a rivet with a screw and nut, wherewith each short ruler is fastened to the middle of each long one. The piece, N° 3. is a pillar, one end whereof, being hollowed into a screw, has a nut fitted to it. At the other end is a worm to screw into the table; when the instrument is to be used, it joins the ends of the two short rulers. The piece, N° 4. is a pen, portcrayon, or pencil, screwed into a little pillar. Lastly, the piece, N° 5. is a brass point, moderately blunt, screwed likewise into a little pillar.

Use of the PENTAGRAPH, or Parallelogram. 1. To copy a design in the same scale or bigness as the original: screw the worm N° 3. into the table; lay a paper under the pencil N° 4. and the design under the point N° 5. This done, conducting the point over the several lines and parts of the design, the pencil will draw or repeat the same on the paper.

2. If the design be to be reduced—*e. gr.* into half the space, the worm must be placed at the end of the long ruler, N° 4. and the paper and pencil in the middle. In this situation conduct the brass point over the several lines of the design, as before; and the pen-

cil at the same time will draw its copy in the proportion required; the pencil here only moving half the lengths that the point moves.

Hence, on the contrary, if the design be to be enlarged by one half, the brass point, with the design, must be placed in the middle, at N° 3. the pencil and paper at the end of the long ruler, and the worm at the other.

3. To enlarge or reduce in other proportions, there are holes drilled at equal distances on each ruler, *viz.* all along the short ones, and half way of the long ones, in order for placing the brass point, pencil, and worm, in a right line therein; *i. e.* if the piece carrying the point be put in the third hole, the two other pieces must be put in its third hole.

If, then, the point and design be placed at any hole of the great rulers, and the pencil with the paper at any hole of the short ruler, which forms the angle therewith, the copy will be less than half the original. On the contrary, if it be placed at one of the holes of that short ruler, which is parallel to the long ruler, the copy will be greater than half the original.

The construction of this instrument requires a degree of accuracy which most of our instrument-makers are strangers to; for which reason there are very few of the instruments that succeed. Few will do any thing tolerably but straight lines; and many of them not even those.

In order to prove that the figure described by a pentagraph is similar to the given figure, let C (fig. 15.) be the fixed centre of motion; P the pencil for tracing the given figure PP, and *p* the pencil which traces the other figure *pp*; *p*, &c. must be so adjusted, that *p*, C, and P, may lie in one straight line; then, since $Bp : Ap :: BP : AC$, whatever be the situation of the pentagraph, the angles PCP and *pCp* are vertical; and therefore PC*p* will in every position of the instrument be a right line: but $PC : pC :: BA : Ap$, in each of the two positions in the figure, and consequently the triangles PCP, *pCp*, are similar; and $PP : pp :: PC : pC :: BA : Ap$, or in a given ratio. Hence it appears, that, by moving the pencil *p*, *Ap* may be equal to BA, or less in any proportion; and consequently *pp* may be equal to PP, or less, in the same proportion.

PENTAMETER, in ancient poetry, a kind of verse, consisting of five feet, or metres, whence the name. The two first feet may be either dactyls or spondees at pleasure; the third is always a spondee; and the two last anapestes: such is the following verse of Ovid.

1 2 3 4 5
Carmini|bus vi|ves tem|pus in om|ne meis.

A pentameter verse subjoined to an hexameter, constitutes what is called *elegiac*. See ELEGIAC.

PENTANDRIA (from *πεντε* five, and *ανρ* a man or husband); the name of the fifth class in Linnæus's sexual method, consisting of plants which have hermaphrodite flowers, with five stamina or male organs. See BOTANY, p. 430.

PENTAPETALOUS, an appellation given to flowers which consist of five petals or leaves.

PENTAPETES, in botany: A genus of the decandria order, belonging to the monodelphia class of plants; and in the natural method ranking under the

Penta-
graph
||
Pentapetes.

Pentapolis
Pentateuch.

37th order, *Columnifera*. The calyx is quinquepartite; the stamina are 20 in number, of which five are castrated and long; the capsule quinquelocular and polyspermous. There is but one species known in the gardens of this country, viz. the phœnicia, with halbert-pointed, spear-shaped, sawed leaves. It is an annual plant, a native of India, and rises to the height of two or three feet, adorned with fine scarlet flowers, consisting of one petal cut into five segments. In the centre of the flower arises a short thick column, to which adhere 15 short stamina. It is a tender plant, and must be brought up in the hot-house.

PENTAPOLIS. This name is given to the five cities, Sodom, Gomorrah, Adamah, Zeboim, and Zoar (Wisdom x. 6.) They were all five condemned to utter destruction, but Lot interceded for the preservation of Zoar, otherwise called *Bala*. Sodom, Gomorrah, Adamah, and Zeboim, were all consumed by fire from heaven, and in the place where they stood was made the lake Asphaltites, or the lake of Sodom.

PENTAPOLIS (Ptolémy), a district of Cyrenaica; situated on the Mediterranean; denominated from its five cities; namely, Berenice, Arsinoe, Ptolemais, Cyrene, and Apollonia.

PENTAPOLIS of the Philistines (Josephus); taking name from five principal cities, Gaza, Gath, Ascalon, Azotus, and Ekron.

PENTATEUCH. This word, which is derived from the Greek *πεντατευχος*, from *πεντε* five, and *τευχος* an instrument or volume, signifies the collection of the five instruments or books of Moses, which are Genesis, Exodus, Leviticus, Numbers, and Deuteronomy: each of which books we have given an account of under their several names.

There are some modern critics who have disputed Moses's right to the pentateuch. They observe that the author speaks always in the third person. "Now the man Moses was very meek above all the men which were upon the face of the earth. The Lord spake unto Moses, saying, &c. Moses said to Pharaoh, &c." Thus they think he would never have spoken of himself; but would at least sometimes have mentioned himself in the first person. Besides this, say they, the author of the pentateuch sometimes abridges his narration like a writer who collected from some ancient memoirs. Sometimes he interrupts the thread of his discourse; for example, he makes Lamech the bigamist to say (Gen. iv. 23.), "Hear my voice, ye wives of Lamech, hearken unto my speech; for I have slain a man to my wounding, and a young man to my hurt," without informing us before-hand to whom this is related. These observations, for example (Gen. xii. 6.), "And the Canaanite was then in the land," cannot be reconciled to the age of Moses, since the Canaanites continued to be the masters of Palestine all the time of Moses. The passage out of the book of the wars of the Lord, quoted in the book of Numbers (xxi. 14.), seems to have been clapped in afterwards, as also the first verses of Deuteronomy. The account of the death of Moses, which is at the end of the same book, cannot certainly belong to this legislator; and the same judgment may be made of other passages, wherein it is said, that the places mentioned lay beyond Jordan; that the bed of Og was at Ramah to this day; that the havoth of Jair, or the cities of Jair, were known to

the author, though probably they had not that name till after Moses's time (Numb. xxxii. 41. Deut. iii. 14.)

It is observed also in the text of the pentateuch, that there are some places that are defective; for example, in Exodus (xii. 8.), we see Moses speaking to Pharaoh, where the author omits the beginning of his discourse. The Samaritan inserts in the same place what is wanting in the Hebrew. In other places, the same Samaritan copy adds what is deficient in the Hebrew text; and what it contains more than the Hebrew seems so well connected with the rest of the discourse, that it would be difficult to separate them. Lastly, they believe that they observe certain strokes in the pentateuch which can hardly agree with Moses, who was born and bred in Egypt; as what he says of the earthly paradise, of the rivers that watered it, and ran through it; of the cities of Babylon, Erech, Resen, and Calneh; of the gold of Pison, of the Bdellium, of the stone of Sohem, or onyx-stone, which was to be found in that country. These particulars, observed with such curiosity, seem to prove, that the author of the pentateuch lived beyond the Euphrates. Add what he says concerning the ark of Noah, of its construction, of the place where it rested, of the wood wherewith it was built, of the bitumen of Babylon, &c. But in answer to all these objections, we may observe in general, from an eminent writer* of our own country, that these books are by the most ancient writers ascribed to Moses; and it is confirmed by the authority of heathen writers themselves, that they are of his writing: besides this, we have the unanimous testimony of the whole Jewish nation, ever since Moses's time, from the first writing of them. Divers texts of the pentateuch imply that it was written by Moses, and the book of Joshua, and other parts of scripture, import as much; and though some passages have been thought to imply the contrary, yet this is but a late opinion, and has been sufficiently confuted by several learned men. The Samaritans receive no other scriptures but the pentateuch, rejecting all the other books which are still in the Jewish canon.

PENTATHLON, in antiquity, a general name for the five exercises performed at the Grecian games, viz. wrestling, boxing, leaping, running, and playing at the discus.

PENTECOST, a solemn festival of the Jews; so called, because it was celebrated on the 50th day after the 16th of Nisan, which was the second day of the passover. The Hebrews called it *the feast of weeks*, because it was kept seven weeks after the passover. They then offered the first fruits of the wheat harvest, which was then completed: besides which they presented at the temple seven lambs of that year, one calf, and two rams, for a burnt offering; two lambs for a peace offering; and a goat for a sin offering (Levit. xxiii. 15, 16. Exod. xxxiv. 22. and Deut. xvi. 9, 10.) The feast of the pentecost was instituted among the Israelites, first to oblige them to repair to the temple of the Lord, there to acknowledge his absolute dominion over the whole country, and to offer him the first-fruits of their harvest; and, secondly, that they might call to mind, and give thanks to God, for the law which he had given them from mount Sinai, on the 50th day after their coming out of Egypt.

Pentateuch
Pentecost.

* Jenkin's
Reasonable-
ness of Chris-
tianity.

Patella.

Fig. 1.

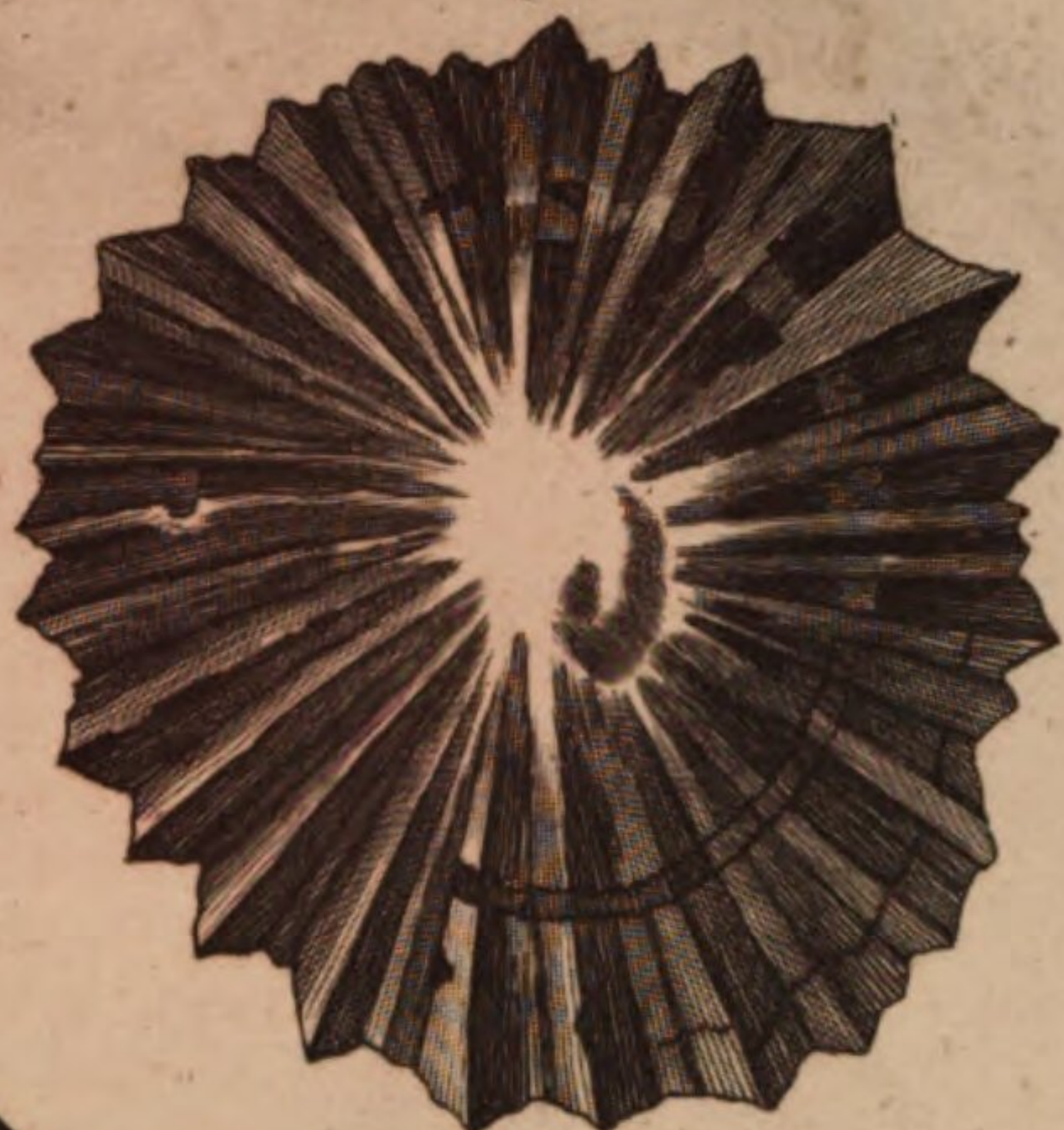


Fig. 5.

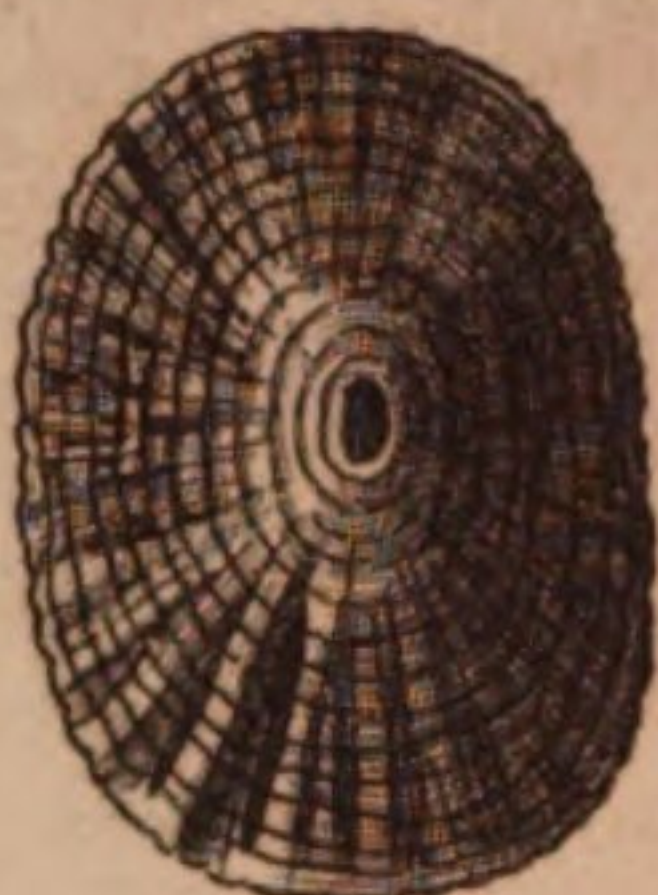


Fig. 8.



Fig. 2.

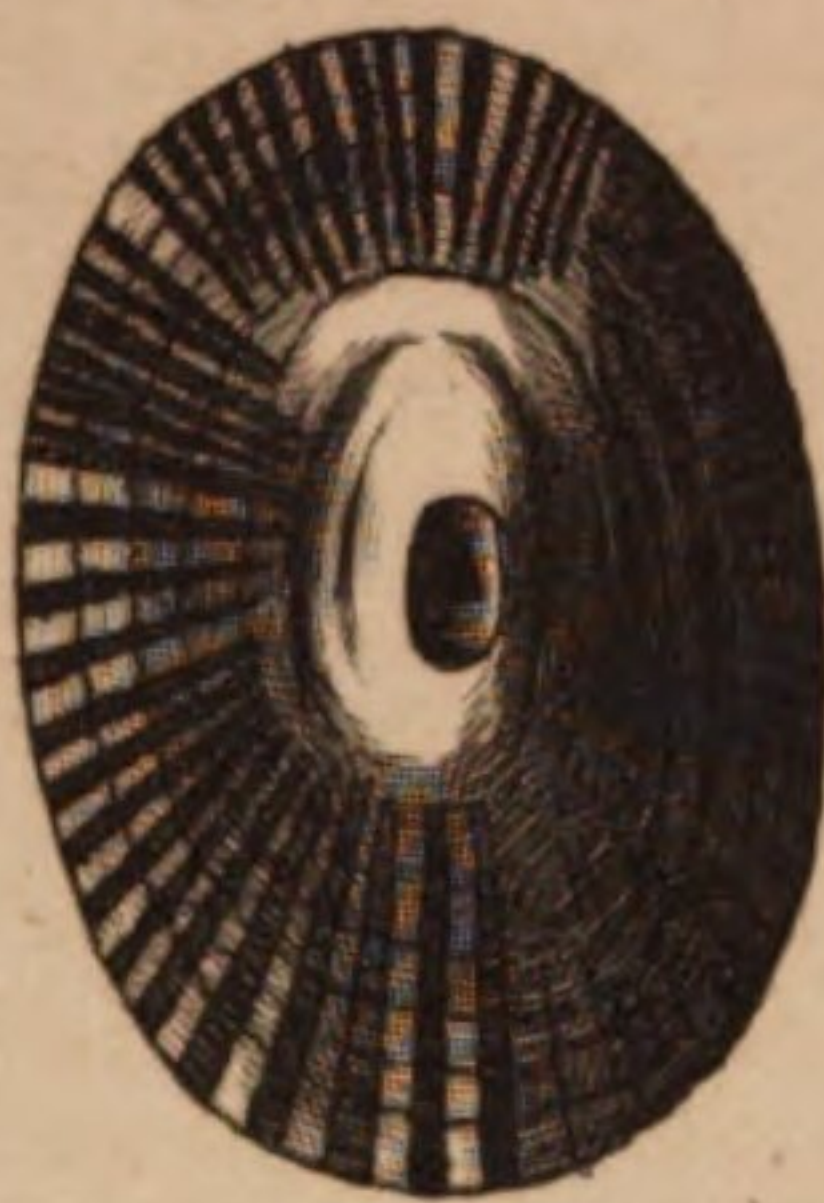


Fig. 3.

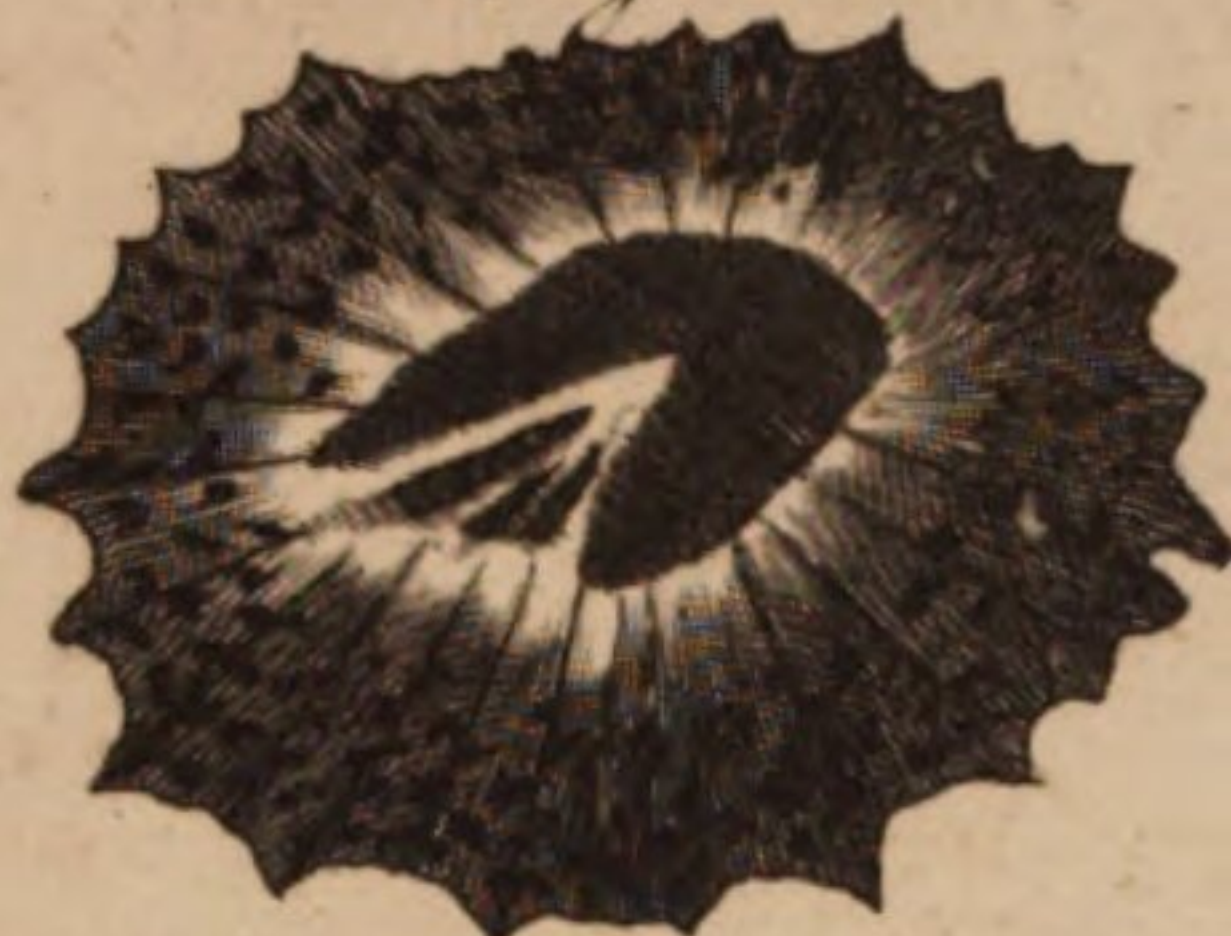


Fig. 7.



Fig. 4.



Fig. 9.



Fig. 6.



Fig. 13.

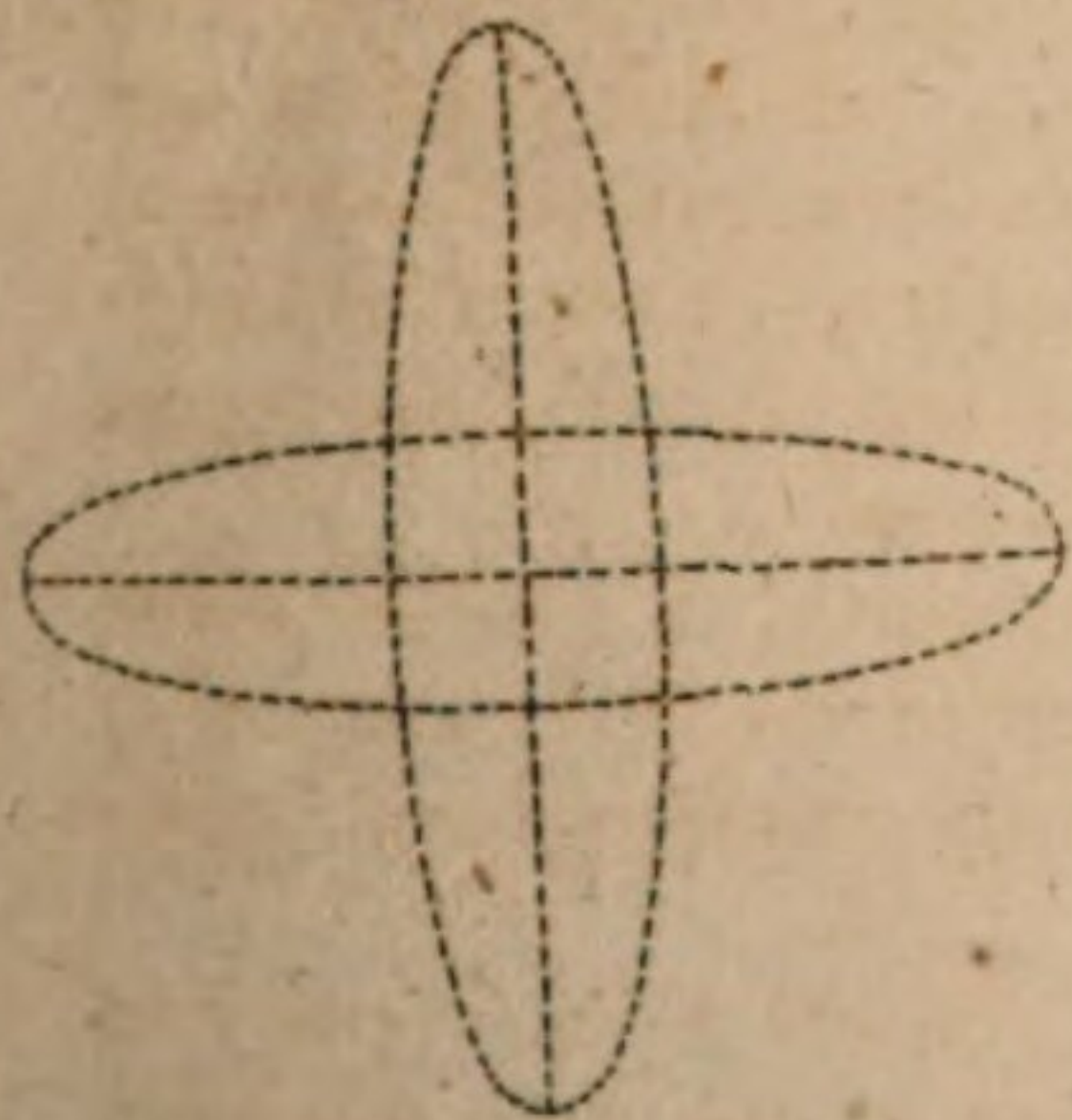


Fig. 12.

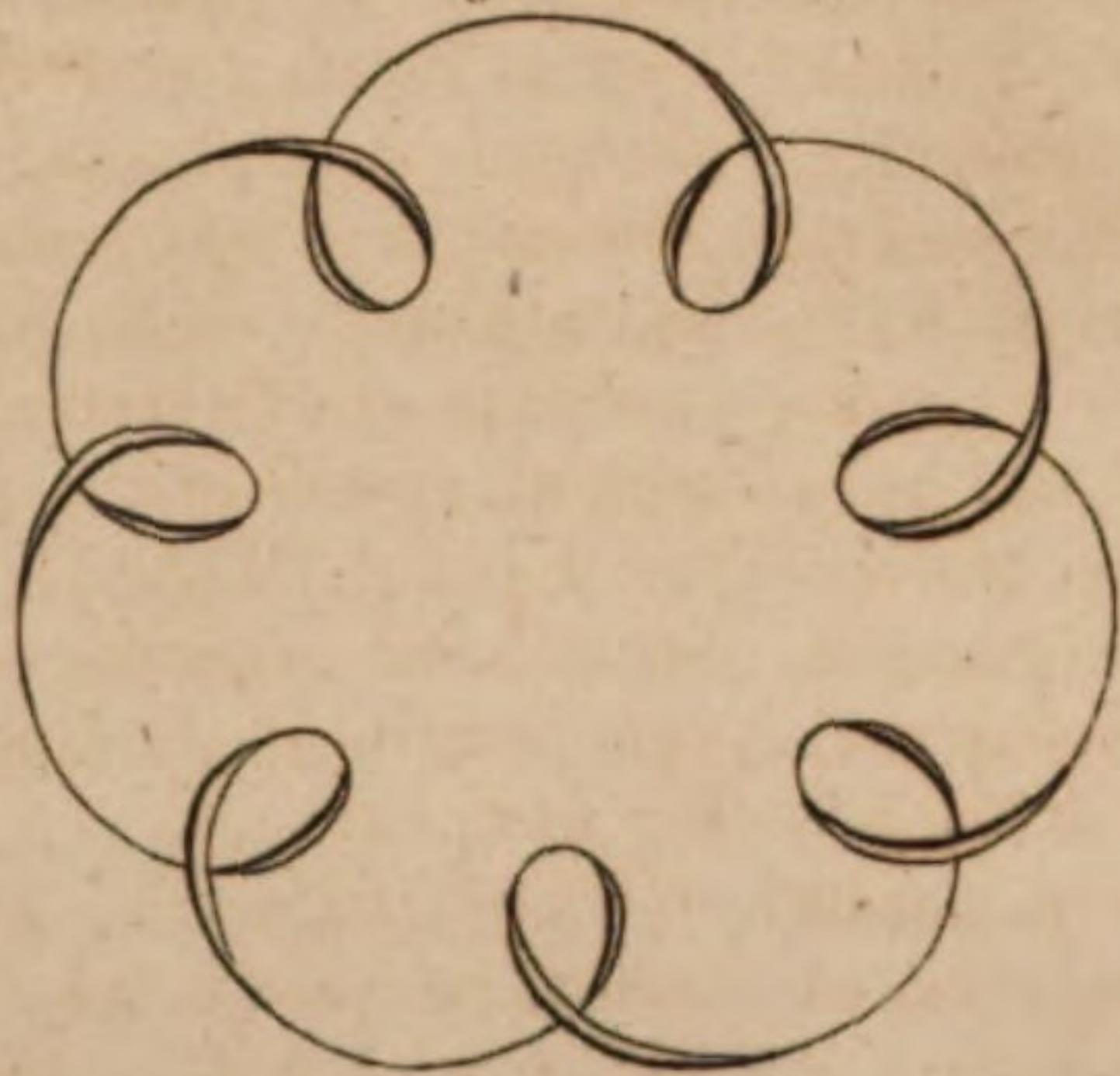


Fig. 11.

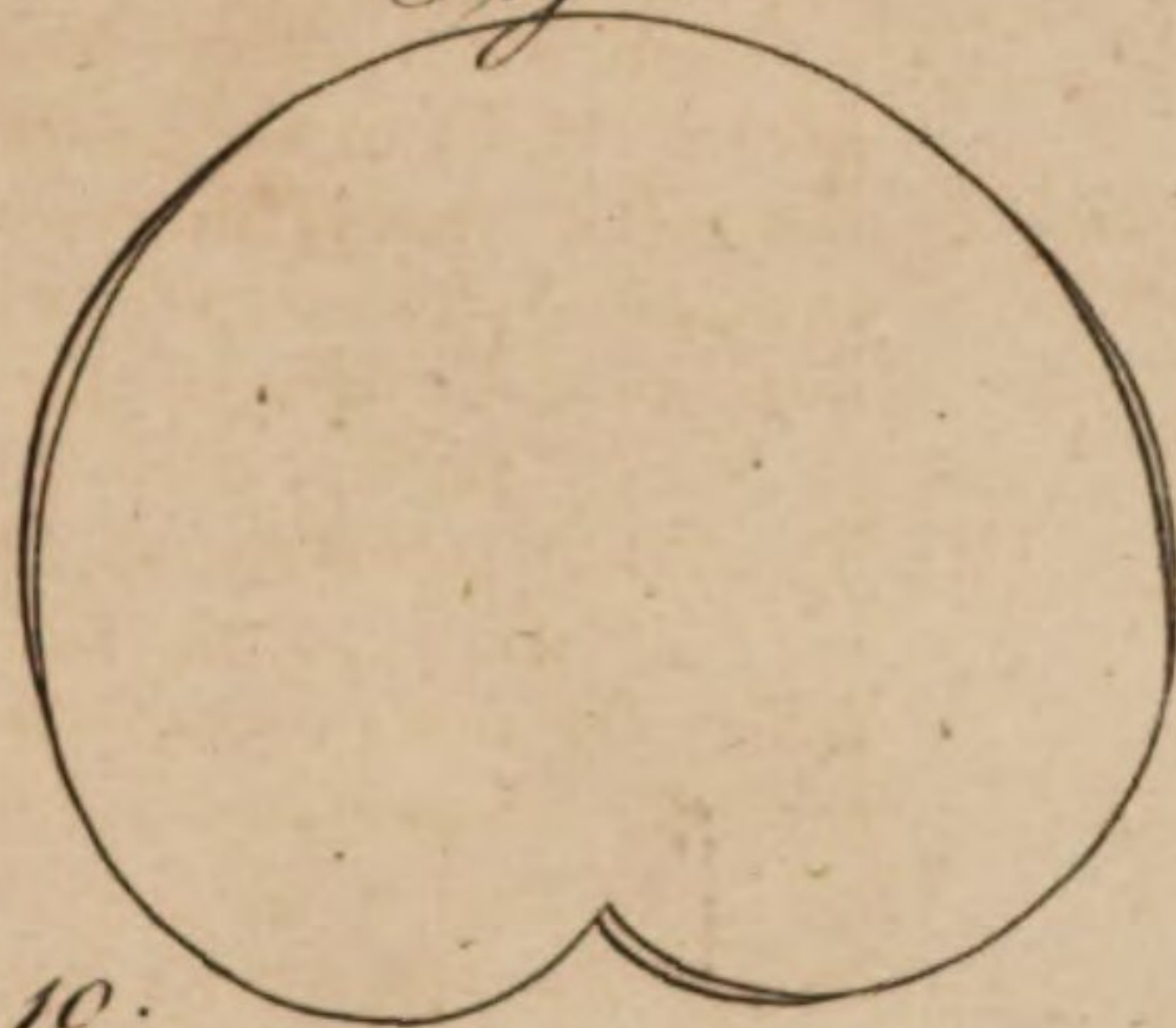
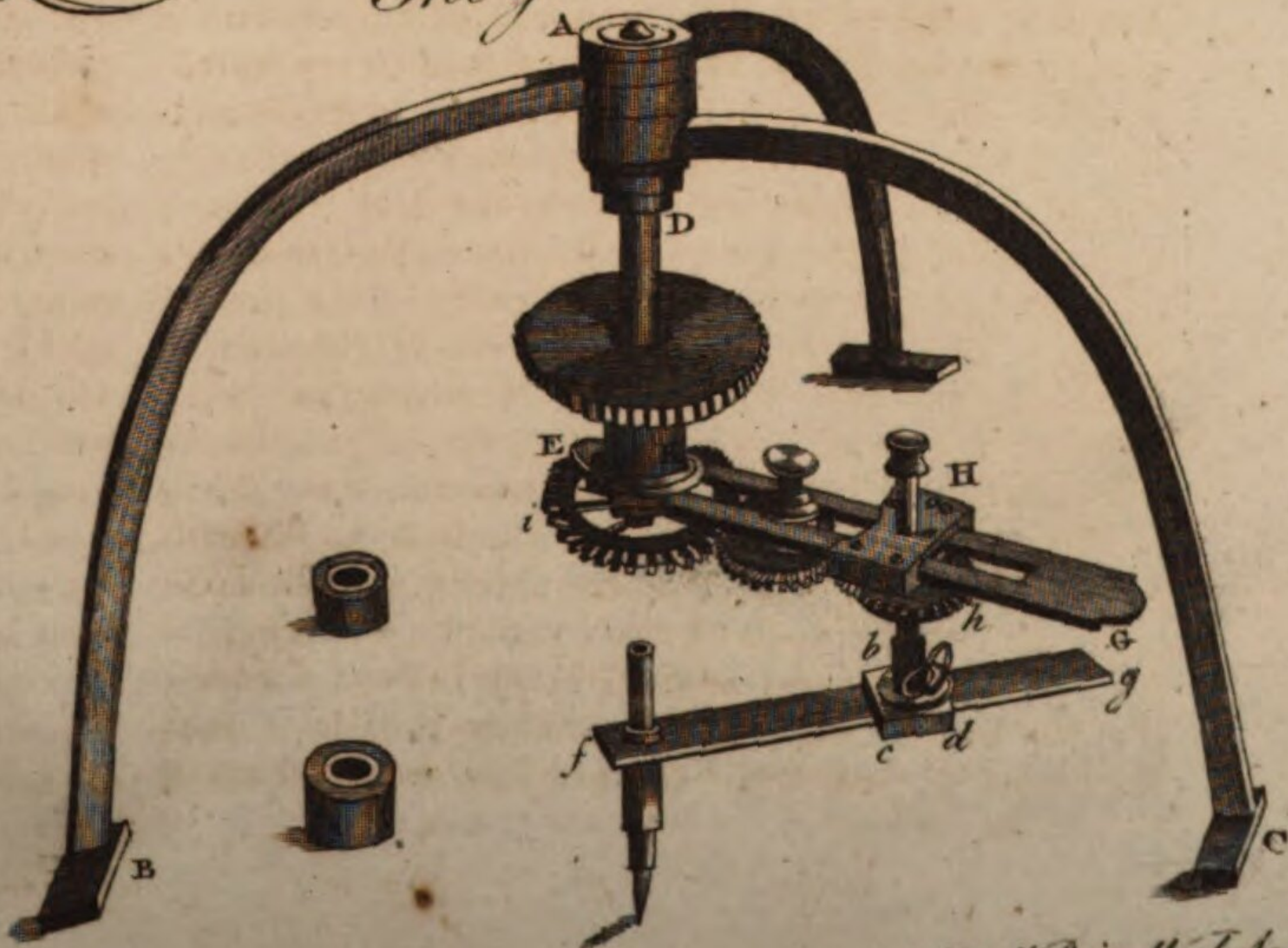


Fig. 10.
The Geometric Pen.



The Fountain Pen.



Penthesilea
||
Peon.

The modern Jews celebrate the pentecost for two days. They deck the synagogue and their own houses with garlands of flowers. They hear a sermon or oration in praise of the law, which they suppose to have been delivered on this day. The Jews of Germany make a very thick cake, consisting of seven layers of paste, which they call *Sinai*. The seven layers represent the seven heavens, which they think God was obliged to reascend from the top of this mountain. See *Leo of Modena et Buxtorf's synag. Jud.*

It was on the feast of pentecost that the Holy Ghost miraculously descended on the apostles of our Lord, who were assembled together after his ascension in a house at Jerusalem (Acts ii.)

PENTHESILEA, queen of the Amazons, succeeded Orythia, and gave proofs of her courage at the siege of Troy, where she was killed by Achilles. Pliny says that she invented the battle-ax.

PENTHORUM, in botany; a genus of the pentagynia order, belonging to the pentandria class of plants. The calyx is quinquefid; there are either five petals or none; the capsule is five-pointed and quinquelocular.

PENTLAND or PICTLAND FRITH, is a narrow strait of six miles between the mainland of Scotland and the Orkney isles. This strait is the great thoroughfare of shipping between the eastern and western seas, the terror of the boldest mariners, and the grave of thousands; where the winter's storms afford many natives on the opposite shores a better livelihood than they could obtain by fishing or husbandry. They search from place to place, and from one cavern to another, in the hopes of finding timber, casks, and other floating articles of the wrecked vessels, of whom six or eight are thus sacrificed sometimes in one night. The navigation of this pass is rendered more dangerous by the island of Stromo, and two rocks called the *Skerries*, lying near the middle of it. See PICTLAND.

PENULA, among the ancient Romans, was a coarse garment or cloak worn in cold or rainy weather. It was shorter than the lacerna, and therefore more proper for travellers. It was generally brown, and succeeded the toga after the state became monarchical. Augustus abolished the custom of wearing the penula over the toga, considering it as too effeminate for Romans; and the ædiles had orders to suffer none to appear in the circus or forum with the lacerna or penula. Writers are not agreed as to the precise difference between these two articles of dress; but we are told that they were chiefly worn by the lower orders of people. See LACERNA.

PENULTIMA, or *PANULTIMATE Syllable*, in grammar, denotes the last syllable but one of a word; and hence the antepenultimate syllable is the last but two, or that immediately before the penultima.

PENUMBRA, in astronomy, a partial shade observed between the perfect shadow and the full light in an eclipse. It arises from the magnitude of the sun's body: for were he only a luminous point, the shadow would be all perfect; but, by reason of the diameter of the sun, it happens, that a place which is not illuminated by the whole body of the sun, does yet receive rays from a part thereof.

PEON, in the language of Hindostan, means a foot soldier, armed with sword and target. In common use

it is a footman, so armed, employed to run before a palanquin. *Piadah* is the proper word, from which *peon* is a corruption.

PEOR, a famous mountain beyond Jordan, which Eusebius places between Heshbon and Livias. The mountains Nebo, Pisgah, and Peor, were near one another, and probably made but the same chain of mountains. It is very likely that Peor took its name from some deity of the same name, which was worshipped there; for Peor, Phegor, or Baal-peor, was known in this country. See Numb. xxv. 3. Deut. iv. 3. Psal. cv. 28.

PEOR, was a city of the tribe of Judah, which is not read in the Hebrew, nor in the Vulgate, but only in the Greek of the Septuagint (Jesh. xv. 60.) Eusebius says it was near Bethlehem, and Jerom adds, that in his time it was called *Paora*.

PEPIN DE HERISTAL, or LE GROS, mayor of the palace under Clovis III. Childbert, and Dagobert. The power of these mayors in France was so great, that they left the sovereign only the empty title, and in the end seized on the throne itself.

PEPIN le Brief, or le Petit, grandson to Pepin le Gros, and first king of the second race of French monarchs, was mayor of the palace to Childeric III. a weak prince: he contrived to confine him and his son Thierri in different monasteries; and then, with the assistance of pope Stephen III. he usurped the sovereign power. He died in 768, aged 54.

PEPLIS, in botany: A genus of the monogynia order, belonging to the hexandria class of plants; and in the natural method ranking under the 17th order, *Calycanthemæ*. The perianthium is campanulated; the mouth cleft in 12 parts; there are six petals inserted into the calyx; the capsule is bilocular.

PEPLUS, a long robe worn by the women in ancient times, reaching down to the feet, without sleeves, and so very fine, that the shape of the body might be seen through it. The Athenians used much ceremony in making the peplus, and dressing the statue of Minerva with it. Homer makes frequent mention of the peplus of that goddess.

PEPPER, PIPER, in natural history, an aromatic berry of a hot dry quality, chiefly used in seasoning. We have three kinds of pepper at present used in the shops, the black, the white, and the long pepper.

Black pepper is the fruit of the piper, and is brought from the Dutch settlements in the East Indies. See PIPER.

The common white pepper is factitious, being prepared from the black in the following manner: they steep this in sea-water, exposed to the heat of the sun for several days, till the rind or outer bark loosens; they then take it out, and, when it is half dry, rub it till the rind falls off; then they dry the white fruit, and the remains of the rind blow away like chaff. A great deal of the heat of the pepper is taken off by this process, so that the white kind is more fit for many purposes than the black. However, there is a sort of native white pepper produced on a species of the same plant; which is much better than the factitious, and indeed little inferior to the black.

The long pepper is a dried fruit, of an inch or an inch and an half in length, and about the thickness of a large goose quill: it is of a brownish grey colour,

Peor
||
Pepper.

Pepper,
Pepper-
mint.

cylindrical in figure, and said to be produced on a plant of the same genus.

Pepper is principally used by us in food, to assist digestion: but the people in the East Indies esteem it as a stomachic, and drink a strong infusion of it in water by way of giving them an appetite: they have also a way of making a fiery spirit of fermented fresh pepper with water, which they use for the same purposes. They have also a way of preserving the common and long pepper in vinegar, and eating them afterwards at meals.

Jamaica PEPPER, or *Pimento*. See *PIMENTO*.

PEPPER-Mint. See *MENTHA*.

PEPPER-Pot. See *CAPSICUM*.

PEPPER Water, a liquor prepared in the following manner, for microscopical observations: put common black pepper, grossly powdered, into an open vessel so as to cover the bottom of it half an inch thick, and put to it rain or river-water, till it covers it an inch; shake or stir the whole well together at the first mixing, but never disturb it afterwards: let the vessel be exposed to the air uncovered; and in a few days there will be seen a pellicle or thin skin swimming on the surface of the liquor, looking of several colours.

This is a congeries of multitudes of small animals; and being examined by the microscope, will be seen all in motion: the animals, at first sight, are so small as not to be distinguishable, unless to the greatest magnifiers; but they grow daily till they arrive at their full size. Their numbers are also continually increasing, till the whole surface of the liquor is full of them, to a considerable depth. When disturbed, they will sometimes all dart down to the bottom; but they soon after come up to the surface again. The skin appears soonest in warm weather, and the animals grow the quickest: but in the severest cold it will succeed, unless the water freezes.

About the quantity of a pin's head of this scum, taken up on the nib of a new pen, or the tip of a hair-pencil, is to be laid on a plate of clear glass; and if applied first to the third magnifier, then to the second, and finally to the first, will show the different animalcules it contains, of several kinds and shapes as well as sizes.

PEPPERMINT-TREE, in botany; the *Eucalyptus piperita*.

In a journal of a voyage to New South Wales, by John White, Esq; we have a plate of this tree, with the following account of it: "This tree grows to the height of more than 100 feet, and is above 30 feet in circumference. The bark is very smooth, like that of the poplar. The younger branches are long and slender, angulated near the top; but as they grow older, the angles disappear. Their bark is smooth, and of a reddish brown. The leaves are alternate, lanceolate, pointed, very entire, smooth on both sides, and remarkably unequal or oblique at their base; the veins alternate, and not very conspicuous. The whole surface of both sides of the leaves is marked with numerous minute resinous spots, in which the essential oil resides. The footstalks are about half an inch in length, round on the under side, angular above, quite smooth. The flowers we have not seen. What Mr White has sent as the ripe capsules of this tree (although not attached to the specimens of the leaves) grow in clusters, from six to eight in each, sessile and

conglomerated. These clusters are supported on angular alternate footstalks, which form a kind of panicle. Each capsule is about the size of an hawthorn berry, globular, but as it were cut off at the top, rugged on the outside, hard and woody, and of a dark-brown colour. At the top is a large orifice, which shows the internal part of the capsule divided into four cells, and having a square column in the centre, from which the partitions of the cell arise. These partitions extend to the rim of the capsule and terminate in four small projections, which look like the teeth of a calyx. The seeds are numerous, small, and angular.

"The name of *peppermint tree* has been given to this plant by Mr White, on account of the very great resemblance between the essential oil drawn from its leaves and that obtained from the peppermint (*mentha piperita*) which grows in England. This oil was found by Mr White to be much more efficacious in removing all cholicky complaints than that of the English peppermint, which he attributes to its being less pungent and more aromatic. A quart of the oil has been sent by him to Mr Wilson.

"The tree above described appears to be undoubtedly of the same genus with that cultivated in some greenhouses in England, which Mr L'Heritier has described in his *Sertum Anglicum* by the name of *Eucalyptus obliqua*, though it is commonly called in the gardens *Metrosideros obliqua*; but we dare not assert it to be the same species, nor can this point be determined till the flowers and every part of both be seen and compared; we have compared the best specimens we could procure of each, and find no specific difference. The *eucalyptus obliqua* has, when dried, an aromatic flavour, somewhat similar to our plant. We have remarked, indeed, innumerable minute white spots, besides the resinous ones, on both surfaces of the leaves in some specimens of the garden plant, which are not to be seen in ours; and the branches of the former are rough, with small scaly tubercles. But how far these are constant, we cannot tell. The obliquity in the leaves, one side being shorter at the base than the other, as well as somewhat narrower all the way up, as in the *Begonia nitida* of the *Hortus Kewensis*, is remarkable in both plants.

"The figure represents a branch of the peppermint tree in leaf: on one side of it part of a leaf separate, bearing the gall of some insect; on the other the fruit above described."

PERA, one of the suburbs of Constantinople, where ambassadors and Christians usually reside. See *CONSTANTINOPLE*.

PERAMBULATOR, in surveying, an instrument for measuring distances, called also *pedometer*, *way-wiser*, and *surveying-wheel*. See *PEDOMETER*.

It consists of a wheel AA, two feet seven inches and a half in diameter; consequently half a pole, or eight feet three inches, in circumference. On one end of the axis is a nut, three quarters of an inch in diameter, and divided into eight teeth; which, upon moving the wheel round, fall into the eight teeth of another nut c, fixed on one end of an iron-rod Q, and thus turn the rod once round in the time the wheel makes one revolution. This rod, lying along a groove in the side of the carriage of the instrument, under the dotted line, has at its other end a square hole, into which is fitted the end b of a small cylinder P. This cylinder

Pepper-
mint
||
Perambula-
tor.

Plate
CCCLXXXVIII

Plate
CCCLXXVII.

Perambulator, Perca. cylinder is disposed under the dial-plate of a movement, at the end of the carriage B, in such a manner as to be moveable about its axis: its end *a* is cut into a perpetual screw, which falling into the 32 teeth of a wheel perpendicular thereto, upon driving the instrument forward, that wheel makes a revolution each 16th pole. On the axis of this wheel is a pinion with six teeth, which, falling into the teeth of another wheel of 60 teeth, carries it round every 160th pole, or half a mile.

This last wheel, carrying a hand or index round with it over the divisions of a dial-plate, whose outer limb is divided into 160 parts, corresponding to the 160 poles, points out the number of poles passed over. Again, on the axis of this last wheel is a pinion, containing 20 teeth, which falling into the teeth of a third wheel which hath 40 teeth, drives it once round in 320 poles, or a mile. On the axis of this wheel is a pinion of 12 teeth, which, falling into the teeth of a fourth wheel having 72 teeth, drives it once round in 12 miles.

This fourth wheel, carrying another index over the inner limb of the dial-plate, divided into 12 for miles, and each mile subdivided into halves, quarters, and furlongs, serves to register the revolutions of the other hand, and to keep account of the half miles and miles passed over as far as 12 miles.

The use of this instrument is obvious from its construction. Its proper office is in the surveying of roads and large distances, where a great deal of expedition, and not much accuracy, is required. It is evident, that driving it along and observing the hands, has the same effect as dragging the chain and taking account of the chains and links.

Its advantages are its hardness and expedition; its contrivance is such, that it may be fitted to the wheel of a coach, in which state it performs its office, and measures the road without any trouble at all.

PERCA, the **PERCH**; a genus of fishes belonging to the order of thoracici. The head is furnished with scaly and serrated opercula; there are seven rays in the membrane of the gills; and the fins on the back are prickly. There are 38 species, principally distinguished by peculiarities in the back fin. The most remarkable are,

1. The *fluviatilis*, or common perch, hath a deep body, very rough scales, and the back much arched. The colours are beautiful; the back and part of the sides being of a deep green, marked with five broad black bars pointing downwards; the belly is white, tinged with red; the ventral fins of a fine scarlet; the anal fins and tail of the same colour, but rather paler. In a lake called *Llyn Raithlyn*, in Merionethshire in Wales, is a very singular variety of this fish; the back part is quite hunched, and the lower part of the backbone next the tail strangely distorted: in colour and other respects it resembles the common perch, which are as numerous in this lake as the deformed fish. They are not peculiar to this water; for Linnæus takes notice of them in a lake at Fahlun in his country. It is said that they are also met with in the Thames near Marlow.

The perch was much esteemed as food by the Romans, nor is it less admired at present as a firm and delicate fish; and the Dutch are particularly fond of it

when made into a dish called *water-fouchy*. It is a gregarious fish; and loves deep holes and gentle streams; is exceedingly voracious, and an eager biter: if the angler meets with a shoal of them, he is sure of taking every one.—It is a common notion that the pike will not attack this fish, on account of the spiny fins which the perch erects on its approach. This may be true of large fish; but it is well known that small perches are the most tempting bait which can be laid for the pike. The perch is very tenacious of life, and has been known to survive a journey of 60 miles in dry straw. It seldom grows to a large size, though Mr Pennant mentions one that weighed nine pounds; but this, he tells us, is very uncommon.

2. The labrax, or baffle, is a very voracious, strong, and active fish. Ovid calls them *rabidi lupi*, a name continued to them by after writers; and they are said to grow to the weight of fifteen pounds. The irides are silvery; the mouth large; the teeth are situated in the jaws, and are very small: in the roof of the mouth is a triangular rough space, and just at the gullet are two others of a roundish form. The scales are of a middling size, are very thick set, and adhere closely. The body is formed somewhat like that of a salmon. The colour of the back is dusky, tinged with blue. The belly is white. In young fish the space above the side-line is marked with small black spots.—It is esteemed a very delicate fish.

3. The *perca marina*, or sea-perch, is about a foot long: the head large and deformed; eyes great; teeth small and numerous. On the head and covers of the gills are strong spines. The colour red, with a black spot on the covers of the gills, and some transverse dusky lines on the sides. It is a fish held in some esteem at the table.

4. The *cernua*, or ruffe, is found in several of the English streams: it is gregarious, assembling in large shoals, and keeping in the deepest part of the water. It is of a much more slender form than the perch, and seldom exceeds six inches in length. The teeth are very small, and disposed in rows. It has only one dorsal fin, extending along the greatest part of the back; the first rays, like those of the perch, are strong, sharp, and spiny; the others soft. The body is covered with rough compact scales. The back and sides are of a dirty green, the last inclining to yellow, but both spotted with black. The dorsal fin is spotted with black; the tail marked with transverse bars.

5. The *nilotica*, or perch of the Nile, is taken about Cairo. The flesh has a sweet and exquisite flavour, and is not hard, but very white. It is one of the best fishes in the Nile; and as it is of the largest size in Egypt, it adorns a table if brought upon it entire and well fried. See *Pilot-Fish*.

PERCEPTION, is a word which is so well understood, that it is difficult for the lexicographer to give any explanation of it. It has been called the first and most simple act of the mind by which it is conscious of its own ideas. This definition, however, is improper, as it confounds perception with consciousness; although the objects of the former faculty are things without us, those of the latter the energies of our own minds. Perception is that power or faculty by which, through the medium of the senses, we have

Perception, the cognizance of objects distinct and apart from ourselves, and learn that we are but a small part in the system of nature. By what process the senses give us this information, we have endeavoured to show elsewhere, (See METAPHYSICS, Part I. Chap. i.) ; and we should not again introduce the subject, but to notice a singular opinion of a very able writer, whose work has been given to the public since our article alluded to had issued from the press.

Dr Sayers, who is an ornament to that school in which we are strongly inclined to enlist ourselves, has endeavoured to prove that no man can perceive two objects, or be conscious of two ideas at the same instant. If this be true, not only our theory of time (see METAPHYSICS, Part II. Chap. vii.) is grossly absurd, but even memory itself seems to be an imaginary faculty. If a man be not conscious of his present existence, at the very instant when he thinks of a past event, or reviews a series of past transactions, it is difficult, to us indeed impossible, to conceive what idea he can have of time, or what he can mean when he says that he remembers a thing. But let us examine the reasoning by which the ingenious author endeavours to establish his opinion.

† *Disquisitions Metaphysical and Literary.*

“ If we reflect (says he †) upon the surprising velocity with which ideas pass through the mind, and the remarkable rapidity with which the mind turns itself, or is directed from one object of contemplation to another, this might alone give us some suspicion that we may probably be mistaken in supposing ideas to be synchronously perceived. Other arguments may be adduced to strengthen this suspicion. It will be granted, I believe, that the mind, whether immaterial or the result of organization, has certainly a wholeness or unity belonging to it, and that it is either not composed of parts, or that no one of the parts from which it originates is itself mind : in this case, it is difficult to conceive how two ideas should be impressed upon the mind at the same instant ; for this would be supposing that part of the mind could receive one idea, and part another, at the same time ; but if the parts do not perceive singly, this is evidently impossible. If, on the other hand, this self-division of the mind does not take place, then if two ideas are nevertheless to be perceived at the same instant, it would seem that those ideas must be so blended with each other, that neither of them could appear distinct. If we examine the manner in which a complex idea is perceived, we shall find very clearly, that the whole of such an idea is never present to the mind at once. In thinking of a centaur, for instance, can we at the same moment be thinking of the parts of a man and the parts of a horse ? Can we not almost detect the gliding of the mind from the one to the other ? In contemplating the complex idea of gold, are the ideas of its colour, ductility, hardness, and weight, all present to the mind at the same instant ? I think, if we accurately attend to it, we shall find a perceptible time has elapsed before this complex idea has been perfectly formed in our mind : but if all the parts of a complex idea cannot be recalled at the same instant, is it not reasonable to infer that these parts are also singly impressed, and not all originally perceived at the same instant ?”

This reasoning is plausible, but perhaps not convincing. Surely we have all been conscious of bodily pain

or pleasure with our eyes open, and been offended by disagreeable smells at the very instant that we looked at objects beautifully coloured. That our ideas pass through the mind with great velocity, and that the mind can rapidly turn itself from one subject of contemplation to another, are truths which cannot be controverted ; but instead of leading us to suppose that two or more objects cannot be synchronously perceived, or two or more ideas synchronously apprehended, they appear to furnish a complete proof of the reverse of all this. For we beg leave to ask how we come to know that ideas pass with velocity through the mind, if we be not all the while conscious of something that is permanent ? If we can contemplate but one idea at once, it is plainly impossible that two or more can be compared together ; and therefore we cannot possibly say that any particular train has passed through the mind with a degree of velocity greater or less than that which we have usually experienced ; nay, we cannot say that we have ever experienced a train of ideas at all, or even been conscious of a single idea, besides the immediate object of present apprehension. That the mind is an individual, we most readily grant ; but that it should therefore be incapable of having *two* ideas synchronously excited in it, is a proposition for which the author has brought no evidence. That it is difficult to conceive *how* this is done, we acknowledge ; but not that it is more difficult than to conceive how a *single* idea is excited in the mind ; for of the mode in which mind and matter mutually operate upon each other, we can form no conception. We know that objects make an impression on the organs of sense ; that this impression is by the nerves communicated to the brain, and that the agitation of the brain excites sensation in the mind : but in *what way* it excites sensation we know not ; and therefore have no reason to suppose that two or more different agitations may not excite two or more synchronous sensations, as well as one agitation excites one sensation. That the agitation given to the brain operates on the mind, is known by experience ; but experience gives us no information respecting the *mode* of that operation. If the mind be, as our author and we suppose, one individual, it cannot, as mind, be either divisible or extended ; and therefore it is certain that the operation in question cannot be, in the proper sense of the word, impression. Hence we have no right to infer, if two objects be perceived at once, either that the idea of the one must be impressed on a part of the mind different from that which receives the impression of the other, or that the two impressions must be so blended with each other, that neither of them could appear distinct ; for this would be to reason from one mode of operation to another ; with which, upon acknowledged principles, it can have nothing in common.

By far the greater part of our ideas are reliëts of *visible* sensations ; and of every thing which we can actually see at once, we may at once contemplate the idea. That we could at once perceive a centaur, if such a being were presented to us, cannot surely be doubted by any one who has ever looked at a man on horseback ; and therefore that we can at the same moment contemplate the whole idea of a centaur, is a fact of which consciousness will not permit us to doubt.— If, indeed, we choose to analyze this complex idea into

Perception to its component parts, it is self-evident that the mind must glide from the one to the other, because the very analysis consists in the separation of the parts, of which, if after that process we think of them, we must think in succession: but that we may have at the same instant, either an actual or ideal view of all the parts of the centaur united, is a proposition so evident as to admit of no other proof than an appeal to experience. In contemplating what the author calls the complex idea of gold, it cannot be denied that the ideas of its colour, ductility, hardness, and weight, are never all present to the mind at the same instant: but the reason is obvious. These are not all *ideas*, in the proper sense of the word, but some of them are ideas, and some notions, acquired by very different processes and very different faculties. Colour is an idea of sensation, immediately suggested through the organ of sight; ductility is a relative notion, acquired by repeated experiments; and gold might be made the object of every sense, without suggesting any such notion. The writer of this article never saw an experiment made on the ductility of gold, and has therefore a very obscure and indistinct notion of that property of the metal; but he is conscious, that he can perceive, at the same instant, the yellow colour and circular figure of a guinea, and have a very distinct, though relative notion, of its hardness.

We conclude, therefore, that the mind is capable of two or more synchronous perceptions, or synchronous ideas; that, during every train which passes through it, it is conscious of its own permanent existence; and that if it were limited to the apprehension of but one idea at once, it could have no remembrance of the past, or anticipation of the future, but would appear to itself, could it make any comparison, to pass away like a flash of lightning.

PERCH, in land-measuring, a rod or pole of 16½ feet in length, of which 40 in length and 4 in breadth make an acre of ground. But, by the customs of several counties, there is a difference in this measure. In Staffordshire it is 24 feet; and in the forest of Sherwood 25 feet: the foot being there 18 inches long; and in Herefordshire a perch of ditching is 21 feet, the perch of walling 16½ feet, and a pole of denshired ground is 12 feet, &c.

PERCHE, a territory of Orleannois in France, 35 miles long, and 30 broad; bounded on the north by Normandy; on the south, by Maine and Dunois; on the east, by Beauce; and on the west, by Maine. It takes its name from a forest, and is pretty fertile. The inhabitants carry on a pretty good trade; and the principal town is Bellesme.

PERCOLATION, the same with **FILTRATION**. See **CHEMISTRY**, n° 568.

PERCUSSION, in mechanics, the impression a body makes in falling or striking upon another; or the shock of two bodies in motion.

PERDICUM, in botany: A genus of the polygamia superflua order, belonging to the syngenesia class of plants; and in the natural method ranking under the 49th order, *Compositæ*. The receptacle is naked; the pappus is simple; the florets bilabiate.

PERDIX. See **TETRAO**.

PEREASLAW, a strong populous town of Po-

land, in the palatinate of Kiovia, situated on the river Perennials Tribecz; in E. Long. 32. 44. N. Lat. 49. 46.

PERENNIALS, or **PERENNIAL FLOWERS**, in botany, a term applied to those plants whose roots will abide many years, whether they retain their leaves in winter or not. Those which retain their leaves are called *evergreens*; but such as cast their leaves are named *deciduous*, or *perditols*.

PERFECT, something to which nothing is wanting, or that has all the requisites of its nature and kind.

PERFECT Cadence, in music. See **CADENCE**.

PERFECT Tense, in grammar. See **PRETERITE**.

PERFECTION, the state or quality of a thing PERFECT.

Perfection is divided, according to Chauvinus, into physical, moral, and metaphysical.

Physical or natural perfection, is that whereby a thing has all its powers and faculties, and those too in full vigour; and all its parts both principal and secondary, and those in their due proportion, constitution, &c. in which sense man is said to be perfect when he has a sound mind in a sound body. This perfection is by the schools frequently termed *εμπειρία*, because a thing is enabled thereby to perform all its operations.

Moral perfection is an eminent degree of virtue or moral goodness, to which men arrive by repeated acts of piety, beneficence, &c. This is usually subdivided into absolute or inherent, which is actually in him to whom we attribute it; and imputative, which exists in some other, and not in him it is attributed to.

Metaphysical, transcendental, or essential perfection, is the possession of all the essential attributes, or of all the parts necessary to the integrity of a substance; or it is that whereby a thing has or is provided of every thing belonging to its nature. This is either absolute, where all imperfection is excluded, such is the perfection of God; or *secundum quid*, and in its kind.

PERFORANS MANUS,

PERFORANS Pedis

PERFORATUS MANUS.

PERFORATUS Pedis.

} See **ANATOMY**, Table
of the Muscles.

PERFUME, denotes either the volatile effluvia from any body affecting the organ of smelling, or the substance emitting those effluvia; in which last sense the word is most commonly used. The generality of perfumes are made up of musk, ambergris, civet, rose and cedar woods, orange-flowers, jessamines, jonquils, tuberoses, and other odoriferous flowers. Those drugs commonly called aromatics, such as storax, frankincense, benzoin, cloves, mace, &c. enter the composition of a perfume; some are also composed of aromatic herbs or leaves, as lavender, marjoram, sage, thyme, hyssop, &c.

The use of perfumes was frequent among the Hebrews, and among the orientals in general, before it was known to the Greeks and Romans. In the time of Moses perfumes must have been known in Egypt, since he speaks of the art of the perfumer, and gives the composition of two kinds of perfumes (Exod. xxx. 25.), of which one was to be offered to the Lord upon the golden altar which was in the holy place; and the other

||
Perfume.

Perfume
||
Pergamum.

other was appointed for the anointing of the high priest and his sons (*ibid.* 34, &c.), as also of the tabernacle, and all the vessels that were used in divine service.

The Hebrews had also perfumes which they made use of in embalming their dead. The composition is not known, but it is certain that they generally made use of myrrh, aloes, and other strong and astringent drugs, proper to prevent putrefaction (*John xix. 49.*) See the article EMBALMING.

Besides the perfumes for these purposes, the scripture mentions other occasions whereon the Hebrews used perfumes. The spouse in the Canticles (*i. 3.*) commends the scent of the perfumes of her lover; and her lover in return says, that the scent of the perfumes of his spouse surpasses the most excellent odours (*id. iv. 10—14.*) He names particularly the spikenard, the calamus, the cinnamon, the myrrh, and the aloes, as making a part of these perfumes. The voluptuous woman described by Solomon (*Prov. vii. 17.*) says, that she had perfumed her bed with myrrh, aloes, and cinnamon. The epicures in the book of Wisdom (*ii. 7.*) encourage one another to the luxuriant use of odours and costly perfumes.

Isaiah (*lvii. 9.*) reproaches Judea, whom he describes as a spouse faithless to God, with being painted and perfumed to please strangers, "Thou wentest to the king with ointment, and didst increase thy perfumes." Ezekiel (*xxiii. 41.*) seems to accuse the Jews with having profaned the odours and perfumes, the use of which was reserved to sacred things, by applying them to their own use.

They came afterwards to be very common among the Greeks and Romans, especially those composed of musk, ambergris, and civet. The *nardus* and *malobathrum* were held in much estimation, and were imported from Syria. The *unguentum nardinum* was variously prepared, and contained many ingredients. *Malobathrum* was an Indian plant. Perfumes were also used at sacrifices to regale the gods; at feasts, to increase the pleasures of sensation; at funerals, to overpower cadaverous smells, and please the manes of the dead; and in the theatres, to prevent the offensive effluvia, proceeding from a crowd, from being perceived.

Since people are become sensible of the harm they do to the head, perfumes are generally disused among us; however, they are still common in Spain and Italy.

PERGAMA (Virgil), the citadel of Troy; which, because of its extraordinary height, gave name to all high buildings (Servius). Others say the walls of Troy were called *Pergama*.

PERGAMUM, (Pliny); called also *Pergamea*, (Virgil); *Pergamia*, (Plutarch); a town of Crete, built by Agamemnon in memory of his victory, (Velleius). Here was the burying-place of Lyncus, (Aristoxenus, quoted by Plutarch). It was situated near Cydonia (Servius); to what point not said: but Scylax helps him out, who places the Dactynnean temple of Diana, which stood near Cydonia (Strabo), to the north of the territory of Pergamia.—Another PERGAMUM (Pliny, Strabo); a town of Mysia, situated on the Caicus, which runs by it. It was the royal residence of Eumenes, and of the kings of the

Attali (Livy). There an ancient temple of *Æsculapius* stood; an asylum (Tacitus). The ornament of Pergamum was the royal library, vying with that of Alexandria in Egypt; the kings of Pergamum and Egypt rivalling each other in this respect (Pliny). Strabo ascribes this rivalry to Eumenes. Plutarch reckons up 200,000 volumes in the library at Pergamum. Here the *membrana pergamena*, whence the name *parchment*, were invented for the use of books, (Varro, quoted by Pliny). The country of Galen, and of Oribasius chief physician to Julian the Apostate (Eunapius), called by some the *ape of Galen*. Here P. Scipio died (Cicero). Attalus son of Eumenes dying without issue, bequeathed his kingdom to the Roman people, who reduced it to a province, (Strabo). *Pergameus*, the epithet (Martial). Here was one of the nine *conventus juridici*, or assemblies of the *Asia Romana*, called *Pergamenus*, and the ninth in order (Pliny); which he also calls *jurisdictio Pergamena*.

PERGAMUS, an ancient kingdom of Asia, formed out of the ruins of the empire of Alexander the Great. It commenced about the year 283. The first sovereign was one Philetærus an eunuch, by birth a Paphlagonian, of a mean descent, and in his youth a menial servant to Antigonius one of Alexander's captains. He afterwards served Lyfimachus king of Macedon and Thrace, who appointed him keeper of his treasures lodged in Pergamus. While he held this employment, having fallen under the displeasure of Arsinoë wife to Lyfimachus, she found means to make a quarrel between him and his master; upon which Philetærus seized on the castle of Pergamus, together with the treasures entrusted to his care, amounting to 90,000 talents. At first he offered his service, together with his treasure, to Seleucus king of Syria: but both Seleucus and Lyfimachus dying soon after, he kept possession of the town and treasure also till his death; which happened 20 years after his revolt from Lyfimachus.

Philetærus left the city of Pergamus to his brother, or, according to some, to his brother's son Eumenes I. and he, laying hold of the opportunity offered by the dissensions among the Seleucidæ, possessed himself of many strong-holds in the province of Asia; and having hired a body of Galatians, defeated Antiochus, as he was returning from a victory gained over his brother Seleucus Callinicus. By this victory he obtained possession of the greater part of Asia: however, he did not long enjoy his acquisitions; for he died next year of immoderate drinking, a vice to which he was greatly addicted.

Eumenes was succeeded by Attalus I. nephew of Philetærus, and the first who took upon him the title of king of Pergamus. He defeated the Gauls, who were desirous of settling in his territory; and, according to Livy, was the first of the Asiatic princes who refused to pay a contribution to these barbarians. When Seleucus Ceraunus was engaged in other wars, he invaded his territories, and conquered all the provinces on this side of Mount Taurus; but was soon driven out of his new acquisitions by Seleucus and his grandfather Achæus, who entering into an alliance against him, deprived him of all his newly acquired territories, and even besieged him in his capital. Upon this

Attalus

Pergamus. Attalus invited to his assistance the Gauls who had settled in Thrace; and with their help not only obliged the enemy to raise the siege of Pergamus, but quickly recovered all the provinces he had lost. After this he invaded Ionia and the neighbouring provinces, where several cities voluntarily submitted to him. The Teians, Colophonians, with the inhabitants of Egea and Lemnos, sent deputies declaring themselves ready to acknowledge him for their sovereign; the Carfenæ, on the other side the river Lycus, opened their gates to him, having first expelled the governor set over them by Achæus. From thence he advanced to Apia, and encamping on the banks of the river Megithus, received homage from the neighbouring nations. But here the Gauls, being frightened by an eclipse of the moon, refused to proceed farther; which obliged Attalus to return to the Hellespont, where he allowed his allies to settle, giving them a large and fruitful territory, and promising that he would always assist and protect them to the utmost of his power.

Attalus having thus settled his affairs with equal honour and advantage to himself, entered into an alliance with Rome, and afterwards joined them in their war against Philip king of Macedon. Here he had the command of the Rhodian fleet; with which he not only drove the Macedonians quite out of the seas, but having landed his men, he, in conjunction with the Athenians, invaded Macedon, and obliged Philip to raise the siege of Athens, which he had greatly distressed; for which services the Athenians not only heaped on him all the favours they could, but called one of their tribes by his name; an honour they had never bestowed on any foreigner before.

Attalus, not contented with all he had yet done against Philip, attempted to form a general confederacy of the Greeks against him. But while he was haranguing the Bœotians to this purpose, and exhorting them with great vehemence to enter into an alliance with the Romans against their common enemy, he fell down speechless. However, he came to himself again, and desired to be carried by sea from Thebes to Pergamus, where he died soon after his arrival, in the 72d year of his age and 43d of his reign.

This prince was a man of great generosity, and such an enthusiast in learning and learned men, that he caused a grammarian named *Daphidas* to be thrown into the sea from the top of a high rock, because he spoke disrespectfully of Homer.

Attalus was succeeded by his eldest son Eumenes II. He was exceedingly attached to the Romans, insomuch that he refused the daughter of Antiochus the Great in marriage, lest he should thus have been led into a difference with that people. He also gave notice to the Roman senate of the transactions of Ariarathes king of Cappadocia, who was making great preparations both by sea and land. Nor did Eumenes stop here; for when he saw the war about to break out between Antiochus and the Romans, he sent his brother Attalus to Rome to give information of the proceedings of Antiochus. The senate heaped honours both on Eumenes and his brother; and in the war which followed, gave the command of their fleet to the king of Pergamus in conjunction with C. Livius Salinator. The victory gained on this occasion was in a great measure

owing to Eumenes, who boarded some of the enemy's *Pergamus.* ships in person, and during the whole action behaved with uncommon bravery. Some time afterwards Eumenes, entering the territories of Antiochus with a body of 5000 men, ravaged all the country about Thyatira, and returned with an immense booty. But in the mean time Antiochus invading Pergamus in his turn, ravaged the whole country, and even laid siege to the capital. Attalus, the king's brother, held out with an handful of men till the Achæans, who were in alliance with Eumenes, sent 1000 foot and 100 horse to his assistance. As this small body of auxiliaries were all chosen men, and commanded by an experienced officer, they behaved with such bravery that the Syrians were obliged to raise the siege. At the battle of Magnesia, too, Eumenes behaved with the greatest bravery; not only sustaining the first attack of the enemy's elephants, but driving them back again on their own troops, which put the ranks in disorder, and gave the Romans an opportunity of giving them a total defeat by attacking them opportunely with their horse. In consequence of this defeat, Antiochus was obliged to conclude a peace with the Romans on such terms as they pleased to prescribe; one of which was, that he should pay Eumenes 400 talents, and a quantity of corn, in recompence for the damage he had done him.

Eumenes now thought of obtaining some reward from the Romans equivalent to the services he had done them. Having gone to Rome, he told the senate, that he was come to beg of them that the Greek cities which had belonged to Antiochus before the commencement of the late war, might now be added to his dominions; but his demand was warmly opposed by the ambassadors from Rhodes, as well as by deputies from all the Greek cities in Asia. The senate, however, after hearing both parties, decided the matter in favour of Eumenes, adding to his dominions all the countries on this side of Mount Taurus which belonged to Antiochus; the other provinces lying between that mountain and the river Mæander, excepting Lycia and Caria, were bestowed on the Rhodians. All the cities, which had paid tribute to Attalus, were ordered to pay the same to Eumenes; but such as had been tributary to Antiochus were declared free.

Soon after this Eumenes was engaged in a war with Prusias king of Bithynia, who made war upon him by the advice of Hannibal the celebrated Carthaginian general. But Eumenes, being assisted by the Romans, defeated Prusias in an engagement by sea, and another by land; which so disheartened him, that he was ready to accept of peace on any terms. However, before the treaty was concluded, Hannibal found means to draw Philip of Macedon into the confederacy, who sent Philocrates, an old and experienced officer, with a considerable body of troops to join Prusias. Hereupon Eumenes sent his brother Attalus to Rome with a golden crown, worth 15,000 talents, to complain of Prusias for making war on the allies of the Roman people without any provocation. The senate accepted the present, and promised to adjust every thing to the satisfaction of their friend Eumenes, whom they looked upon to be the most steady ally they had in Asia. But in the mean time Prusias, having ventured another sea-fight, by a contrivance of Hannibal's, gained a complete

Pergamus. complete victory. The Carthaginian commander advised him to fill a great many earthen vessels with various kinds of serpents and other poisonous reptiles, and in the heat of the fight to throw them into the enemies ships so as to break the pots and let the serpents loose. All the soldiers and seamen were commanded to attack the ship in which Eumenes was, and only to defend themselves as well as they could against the rest; and that they might be in no danger of mistaking the ship, an herald was sent before the engagement with a letter to the king. As soon as the two fleets drew near, all the ships of Prusias, singling out that of Eumenes, discharged such a quantity of serpents into it, that neither soldiers nor sailors could do their duty, but were forced to fly to the shore, lest they should fall into the enemy's hands. The other ships, after a faint resistance, followed the king's example, and were all driven ashore with great slaughter, the soldiers being no less annoyed by the stings of the serpents, than by the weapons of the enemy. The greatest part of the ships of Eumenes were burnt, several taken, and the others so much shattered that they became quite unserviceable. The same year Prusias gained two remarkable victories over Eumenes by land, both of which were entirely owing to stratagems of Hannibal. But, while matters were thus going on to the disadvantage of Eumenes, the Romans interfered, and by their deputies not only put an end to the differences between the two kings, but prevailed on Prusias to betray Hannibal; upon which he poisoned himself, as hath been related under the article HANNIBAL.

Eumenes being thus freed from such a dangerous enemy, engaged in a new war with the kings of Cappadocia and Pontus, in which also he proved victorious. His friendship for the Romans he carried to such a degree of enthusiasm, that he went in person to Rome to inform them of the machinations of Perseus king of Macedon. He had before quarrelled with the Rhodians, who sent ambassadors to Rome to complain of him. But as the ambassadors happened to arrive while the king himself was present in the city, the Rhodian ambassadors could not obtain any hearing, and Eumenes was dismissed with new marks of favour. This journey, however, had almost proved fatal to him; for, on his return, as he was going to perform a sacrifice at Delphi, two assassins, sent by Perseus, rolled down two great stones upon him as he entered the straits of the mountains. With one he was dangerously wounded on the head and with the other on the shoulder. He fell with the blows from a steep place, and thus received many other bruises; so that he was carried on board his ship when it could not well be known whether he was dead or alive. His people, however, soon finding that he was still alive, conveyed him to Corinth, and from Corinth to Ægina, having caused their vessels to be carried over the Isthmus.

Eumenes remained at Ægina till his wounds were cured, which was done with such secrecy, that a report of his death was spread all over Asia, and even believed at Rome; nay, his brother Attalus was so convinced of the truth of this report, that he not only assumed the government, but even married Stratonice the wife of Eumenes. But in a short time Eumenes

convinced them both of his being alive, by returning to his kingdom. On the receipt of this news, Attalus resigned the sovereignty in great haste, and went to meet his brother; carrying an halberd, as one of his guards. Eumenes received both him and the queen with great tenderness, nor did he ever say any thing which might tend to make them uneasy; only it is said he whispered in his brother's ear when he first saw him, "Be in no haste to marry my wife again till you are sure that I am dead."

The king being now more than ever exasperated against Perseus, joined the Romans in their war against him; but during the course of it he suddenly cooled in his affection towards those allies whom he had hitherto served with so much zeal, and that to such a degree, that he admitted ambassadors from Perseus, and offered to stand neuter if he would pay him 1000 talents, and for 1500, to influence the Romans to grant him a safe and honourable peace. But these negotiations were broke off without effect, by reason of the distrust which the two kings had of one another. Eumenes could not trust Perseus unless he paid him the money beforehand; while, on the other hand, Perseus did not care to part with the money before Eumenes had performed what he promised; neither could he be induced to pay the sum in question, though the king of Pergamus offered to give hostages for the performance of his promise. What the reason of such a sudden change in the disposition of Eumenes was, is nowhere told; however, the fact is certain. The negotiations above-mentioned were concealed from the Romans as long as possible; but they soon came to be known: after which the republic began to entertain no small jealousy of their old friend, and therefore heaped favours on his brother Attalus, without taking any notice of the king himself. Eumenes had sent him to Rome to congratulate the senate on the happy issue of the war with Perseus, not thinking that his practices had been discovered. However, the senate, without taking any notice of their disaffection to Eumenes at first, entertained Attalus with the greatest magnificence; then several of the senators who visited him proceeded to acquaint him with their suspicions of the king, and desired Attalus to treat with them in his own name, assuring him, that the kingdom of Pergamus would be granted him, if he demanded it, by the senate. These speeches had at first some effect; but Attalus, being of an honest disposition, and assisted by the advice of a physician called *Stratius*, a man of great probity, resolved not to comply with their desire. When he was admitted to the senate, therefore, he first congratulated them on the happy issue of the Macedonian war, then modestly recounted his own services; and lastly, acquainted them with the motive of his journey; intreated them to send ambassadors to the Gauls, who by their authority might secure his brother from any danger of their hostilities; and he requested them also, that the two cities of Ænus and Maronea might be bestowed on himself. The senate, imagining that Attalus designed to choose some other day to sue for his brother's kingdom, not only granted all his requests, but sent him richer and more magnificent presents than they had ever done before. Upon this Attalus immediately set out on his return to Pergamus; which so provoked the senators, that they declared

Pergamus. declared the cities free which they had promised to Attalus, thus rendering ineffectual their promise which they were ashamed openly to revoke; and as for the Gauls, who were on all occasions ready to invade the kingdom of Pergamus, they sent ambassadors to them, with instructions to behave in such a manner as would rather tend to encourage them in their design than dissuade them from it.

Eumenes, being alarmed at those proceedings, resolved to go in person to Rome, in order to justify himself. But the senate, having already condemned him in their own minds, resolved not to hear his vindication. For this reason, as soon as they heard of his design, they made an act that no king should be permitted to enter the gates of Rome. Eumenes, however, who knew nothing of this act, set forward on his journey, and landed at Brundisium; but no sooner did the Roman senate get intelligence of his arrival there, than they sent a quaestor acquainting him with the decree of the senate; and telling him at the same time, that if he had any business to transact with the senate, he was appointed to hear it, and transmit it to them; but if not, that the king must leave Italy without delay. To this Eumenes replied, that he had no business of any consequence to transact, and that he did not stand in need of any of their assistance; and without saying a word more, went on board his ship, and returned to Pergamus.

On his return home, the Gauls, being encouraged by the cold reception which he had met with at Rome, invaded his territories, but were repulsed with great loss by the king, who afterwards invaded the dominions of Prusias, and possessed himself of several cities. This produced new complaints at Rome; and Eumenes was accused, not only by the ambassadors of Prusias, but also by those of the Gauls and many cities in Asia, of keeping a secret correspondence with Perseus king of Macedon. This last charge was confirmed by some letters which the Romans themselves had intercepted; so that Eumenes found it impossible to keep up his credit any longer at Rome, though he sent his brothers Athenæus and Attalus thither to intercede for him. The senators, in short, had conceived the most implacable hatred against him, and seemed absolutely bent on his destruction, when he died, in the 39th year of his reign, leaving his kingdom and his wife to his brother Attalus. He left one son, but he was an infant, and incapable of governing the kingdom; for which reason Eumenes chose rather to give the present possession of the crown to his brother, reserving the succession to his son, than to endanger the whole by committing the management of affairs to his son's tutors.

Attalus, in the beginning of his reign, found himself greatly distressed by Prusias king of Bithynia, who not only overthrew him in a pitched battle, but advanced to the very walls of Pergamus, ravaging the country as he marched along; and at last reduced the royal city itself. The king, however, saved himself by a timely flight, and dispatched ambassadors to Rome, complaining of the bad usage of Prusias. The latter endeavoured to defend himself, and to throw the blame on Attalus. But, after a proper inquiry was made into the matter, Prusias was found to be entirely in the wrong; in consequence of which, he was at last obli-

ged to conclude a peace with his adversary on the following terms. 1. That he should immediately deliver up to Attalus 20 ships with decks. 2. That he should pay 500 talents to Attalus within the space of 20 years. 3. That he should pay 100 talents to some of the other Asiatic nations by way of reparation for the damages they had sustained from him. And, 4. Both parties should be content with what they had before the beginning of the war.

Some time after this, Prusias having made an unnatural attempt on the life of his son Nicomedes, the latter rebelled, and, with the assistance of Attalus, drove his father from the throne, and, as is said, even murdered him in the temple of Jupiter. The Romans took no notice of these transactions, but showed the same kindness to Attalus as formerly. The last enterprise in which we find Attalus engaged, was against Andriæus the pretended son of Perseus king of Macedon, where he assisted the Romans; after which he gave himself up entirely to ease and luxury, committing state affairs entirely to his ministers; and thus continued to his death, which happened in the 82d year of his age, about 138 B. C.

Attalus II. was succeeded by Attalus III. the son of Eumenes; for the late king, considering that he only held the crown as a trust for his nephew, passed by his own children in order to give it to him, tho' he appears to have been by no means worthy of it. He is said to have been deprived of his senses thro' the violence of his grief for his mother's death; and indeed, throughout his whole reign, he behaved more like a madman than any thing else. Many of his subjects of the highest quality were cut off with their wives and children, upon the most groundless suspicions; and for these executions he made use of mercenaries hired out from among the most barbarous nations. Thus he proceeded till he had cut off all the best men in the kingdom; after which he fell into a deep melancholy, imagining that the ghosts of those whom he had murdered were perpetually haunting him. On this he shut himself up in his palace, put on a mean apparel, let his hair and beard grow, and sequestered himself from all mankind. At last he withdrew from the palace, and retired into a garden, which he cultivated with his own hands, and filled with all sorts of poisonous herbs. These he used to mix with wholesome pulse, and send packets of them to such as he suspected. At last, being weary of this amusement, and living in solitude, because nobody durst approach him, he took it in his head to follow the trade of a foundry, and make a brazen monument. But, while he laboured at melting and casting the brass, the heat of the sun and furnace threw him into a fever, which in seven days put an end to his tyranny, after he had sat on the throne five years.

On the death of the king, a will was found, by which he left the Roman people heirs of all his goods; upon which they seized on the kingdom, and reduced it to a province of their empire by the name of *Asia Proper*. But Aristonicus, a son of Eumenes by an Ephesian courtesan, reckoning himself the lawful heir to the crown, could by no means be satisfied with this usurpation of the Romans, and therefore assembled a considerable army to maintain his pretensions. The people in general, having been accustomed to a mo-

Pergamus. narchy, dreaded a republican form of government; in consequence of which, they assisted Aristonicus, and soon put him in a condition to reduce the whole kingdom. The news, however, were soon carried to Rome; and Licinius Crassus, the pontifex maximus, was sent into the east, with orders to enforce obedience to the king's will. Historians take no notice of any forces which were sent along with this commander; whence it is supposed, that he depended on assistance from the Asiatics, who were in alliance with Rome, or from the Egyptians. But when he came thither, he found both the Syrians and Egyptians so reduced, that he could not expect any assistance from them. However, he was soon supplied with troops in plenty by the kings of Pontus, Bithynia, Cappadocia, and Paphlagonia; but managed matters so ill, that he was entirely defeated and taken prisoner. Those who took him, designed to carry him to Aristonicus; but he, not able to endure the disgrace, would have laid violent hands on himself if he had not been disarmed. However, being allowed to keep a rod for managing the horse on which he sat, he struck a Thracian soldier who stood near him so violently with it, that he beat out one of his eyes; upon which the other drew his sword, and run him thro' on the spot. His head was brought to Aristonicus, who exposed it to public view; but the body was honourably buried.

Aristonicus had no great time to enjoy the fruits of his victory. Indeed he behaved very improperly after it; for, instead of preparing to oppose the next army, which he might have been assured the Romans would send against him, he spent his time in feasting and revelling. But he was soon roused out of his lethargy by Perpenna the new consul, who having assembled with incredible expedition the troops of the allies, came unexpectedly upon him, obliged him to venture an engagement at a disadvantage, and entirely defeated him. Aristonicus fled to a city called *Stratonice*; but was so closely pursued by the conqueror, that the garrison, having no method of supplying themselves with provisions, delivered up their leader, as well as a philosopher named *Blofius*, who had been the companion and counsellor of Aristonicus. The philosopher behaved with great resolution after being taken, and openly defended his siding with Aristonicus, because he thought his cause just. He exhorted the latter to prevent the disgrace and misery of captivity by a voluntary death; but Aristonicus, looking upon death as a greater misery than any captivity, suffered himself to be treated as his conquerors pleased.

In the mean time, a new consul, named *Manius Aquilius*, being arrived from Rome, sent a most haughty message to Perpenna, requiring him immediately to deliver up Aristonicus, as a captive belonging to his triumph when the war should be ended. With this demand Perpenna refused to comply, and his refusal had almost produced a civil war. However, this was prevented by the death of Perpenna, which happened soon after the dispute commenced. The Pergamians, notwithstanding the defeat and captivity of their leader, still held out with such obstinacy, that Aquilius was obliged to besiege, and take by force, almost every city in the kingdom. In doing this, he took a very effectual, though exceeding cruel method. Most of the cities in the kingdom had no other water

than what was brought from a considerable distance in aqueducts. These Aquilius did not demolish, but poisoned the water, which produced the greatest abhorrence of him throughout all the east. At last, however, the whole country being reduced, Aquilius triumphed, the unhappy Aristonicus was led in chains before his chariot, and probably ended his miserable life in a dungeon. The country remained subject to the Romans while their empire lasted, but is now in the hands of the Turks. The city is half ruined, and is still known by the name of *Pergamus*. It is inhabited by about 3000 Turks, and a few families of poor Christians. E. Long. 27. 27. N. Lat. 30. 3.

PERGUNNAH, in the language of Hindostan, means the largest subdivision of a province, whereof the revenues are brought to one particular *head Cutchery*, from whence the accounts and cash are transmitted to the general *Cutchery* of the province.

PERIAGOGE, in rhetoric, is used where many things are accumulated into one period which might have been divided into several.

PERIAGUA, a sort of large canoe made use of in the Leeward islands, South America, and the gulf of Mexico. It is composed of the trunks of two trees hollowed and united together; and thus differs from the canoe, which is formed of one tree.

PERIANDER, tyrant of Corinth and Corcyra, was reckoned among the seven wise men of Greece; though he might rather have been reckoned among the most wicked men, since he changed the government of his country, deprived his countrymen of their liberty, usurped the sovereignty, and committed the most shocking crimes. In the beginning of his reign he behaved with mildness; but after his having sent to the tyrant of Syracuse to consult him on the safest method of government, he abandoned himself to cruelty. The latter, having heard Periander's envoys, took them into a field, and, instead of answering them, pulled up before them the ears of corn which exceeded the rest in height. Periander, on being told of this action, understood what was meant by it. He first secured himself by a good guard, and then put the most powerful Corinthians to death. He abandoned himself to the most enormous crimes; committed incest with his mother, kicked to death his wife Melissa, daughter of Procles king of Epidaurus, notwithstanding her being with child; and was so enraged at Lycophon, his second son, for lamenting his mother's death, that he banished him into the island of Corcyra. Yet he passed for one of the greatest politicians of his time; and Heraclides tells us, that he forbade voluptuousness; that he imposed no taxes, contenting himself with the custom arising from the sale and the import and export of commodities; that, tho' wicked himself, he hated the wicked, and caused all pimps to be drowned; lastly, that he established a senate, and settled the expence of its members. He died 585 B. C.

PERIANTHIUM, (from *περι* "round," and *ανθος* "the flower,") the flower-cup properly so called, the most common species of calyx, placed immediately under the flower, which is contained in it as in a cup. See BOTANY, p. 433, col. 1.

PERICARDIUM, in anatomy, a membranous bag filled with water, which contains the heart in man and

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Pericardium.

Pericar-
pium
||
Perigord.

and many other animals. It is formed by a duplication of the mediastinum, or membrane which divides the thorax into two unequal parts. See ANATOMY, n° 121.

PERICARPIUM, (from *περι* "round," and *καρπός* "fruit,") the seed-vessel; an entrail of the plant big with seeds, which it discharges when ripe. The seed-vessel is in fact the developed seed bud, and may very properly be compared to the fecundated ovary in animals; for it does not exist till after the fertilizing of the seeds by the male-dust, and the consequent fall of the flower. All plants, however, are not furnished with a seed-vessel; in such as are deprived of it, the receptacle or calyx performs its functions by inclosing the seeds, as in a matrix, and accompanying them to perfect maturity.

PERICHORUS, in antiquity, a name given by the Greeks to their profane games or combats, that is, to such as were not consecrated to any of the gods.

PERICLES, was one of the greatest men that ever flourished in Greece. He was educated with all imaginable care; and beside other masters, he had for his tutors Zeno, Eleates, and Anaxagoras. He learned from the last of these to fear the gods without superstition, and to account for an eclipse from a natural cause. Many were unjust enough to suspect him of atheism, because he had perfectly studied the doctrine of that philosopher. He was a man of undoubted courage; and of such extraordinary eloquence, supported and improved by knowledge, that he gained almost as great an authority under a republican government as if he had been a monarch; but yet he could not escape the satirical strokes of the comic poets. His dissoluteness with the women was one of the vices with which he was chiefly charged. He died the third year of the Peloponnesian war, after long sickness, which had weakened his understanding. Aspasia, Pericles's favourite, was a learned woman of Miletus: she taught Socrates rhetoric and politics. As Pericles cared not much for his wife, he willingly gave her up to another, and married Aspasia, whom he passionately loved.

PERICRANIUM, in anatomy, a thick solid coat or membrane covering the outside of the cranium or skull. See ANATOMY, n° 4.

PERIGEE, in astronomy, that point of the sun or moon's orbit wherein they are at the least distance from the earth, in which sense it stands opposed to apogee.

PERIGEUX, an ancient episcopal town of France, capital of the province of Perigord, seated on the river Isle, in E. Long. 0. 33. N. Lat. 45. 18. It is remarkable for the ruins of the temple of Venus, and an amphitheatre.

PERIGORD, a province of France, which makes part of Guienne, bounded on the north by Angoumois and a part of Marche, and on the east by Quercy and Limosin; on the south by Agenois and Bazadois; and on the west, by Bourledeois, Angoumois, and a part of Saintonge. It is about 83 miles in length, and 60 in breadth. It abounds in iron mines, and the air is pure and healthy. Perigeux is the capital town.

PERIGORD-Stone, an ore of manganese, of a dark grey colour, like the basalt or trapp. It may be scraped with a knife, but is extremely difficult to

be broken. It is found of no regular figure, is very compact, heavy, and as black as charcoal. Its appearance is glittering and striated, like the ore of antimony; its particles being disposed in the form of needles, crossing one another without any agglutination, inso-much that some are loose as iron-filings when stuck to a loadstone; resembling the scoria from a blacksmith's furnace. By calcination it becomes harder and of a reddish-brown colour, but is not attracted by the magnet. It has a considerable specific gravity, does not melt *per se*, but with borax runs into a glass of the colour of an amethyst. It is scarcely affected by nitrous acid without the addition of sugar. It seems also to contain some argil and iron. It is met with in Gascony and Dauphiny in France, and in some parts of England. It is employed by the French potters and enamellers in the glassy varnish of their earthen wares.

PERIGRAPHE, a word usually understood to express a careless or inaccurate delineation of any thing; but in Vesalius it is used to express the white lines or impressions that appear on the musculus rectus of the abdomen.

PERIHELIIUM, in astronomy, that part of a planet or comet's orbit wherein it is in its least distance from the sun, in which sense it stands in opposition to aphelium.

PERIMETER, in geometry, the bounds or limits of any figure or body. The perimeters of surfaces or figures are lines; those of bodies are surfaces. In circular figures, instead of perimeter, we say circumference, or periphery.

PERINÆUM, or **PERINEUM**, in anatomy, the space between the anus and the parts of generation, divided into two equal lateral divisions by a very distinct line, which is longer in males than in females.

PERINSKIOLD (John), a learned Swedish writer, born at Stregnesia in Sudermania, in 1654, studied under his father, who was professor of eloquence and poetry, and afterwards became well skilled in the antiquities of the north. He was made professor at Upsal, secretary antiquary of the king of Sweden, and counsellor of the chancery of antiquities. He died in 1720. His principal works are: 1. A History of the Kings of Norway. 2. A History of the Kings of the North. 3. An Edition of John Messenius on the Kings of Sweden, Norway, and Denmark, in 14 vols folio, &c. All Perinskiold's works are excellent, and highly esteemed.

PERIOD, in astronomy, the time taken up by a star or planet in making a revolution round the sun; or the duration of its course till it return to the same part of its orbit. See PLANET.

The different periods and mean distances of the several planets are as follow:

	Days	h.	'	"	mean Dist.
Saturn	10579	6	36	26	953800
Jupiter	4332	12	20	35	520110
Mars	686	23	27	30	152309
Earth	365	6	9	30	100000
Venus	224	16	49	24	72333
Mercury	87	23	15	53	36710

There is a wonderful harmony between the distances
T 2 of

Perigraphe
||
Period.

Period. of the planets from the sun, and their periods round him; the great law whereof is, that the squares of the periodical times of the primary planet, are to each other as the cubes of their distances from the sun: and likewise, the squares of the periodical times of the secondaries of any planet are to each other as the cubes of their distances from that primary. This harmony among the planets is one of the greatest confirmations of the Copernican hypothesis. See ASTRONOMY, n° 414.

For the periods of the moon, see ASTRONOMY, n° 422, and observe *Index* to astronomy.

The periods of several comets are now pretty well ascertained. See ASTRONOMY, n° 171, &c.

PERIOD, in chronology, denotes a revolution of a certain number of years, or a series of years, whereby, in different nations, and on different occasions, time is measured; such are the following.

Calippic PERIOD, a system of seventy-six years. See CALIPPIC, and ASTRONOMY, n° 11, &c.

Dionysian PERIOD, or *Victorian Period*, a system of 532 lunæ-solar and Julian years; which being elapsed, the characters of the moon fall again upon the same day and feria, and revolve in the same order, according to the opinion of the ancients.

This period is otherwise called the *great paschal cycle*, because the Christian church first used it to find the true time of the pascha or easter. The sum of these years arise by multiplying together the cycles of the sun and moon.

Hipparchus's PERIOD, is a series of 304 solar years, returning in a constant round, and restoring the new and full moons to the same day of the solar year, according to the sentiment of Hipparchus. This period arises by multiplying the Calippic period by four.—Hipparchus assumed the quantity of the solar year to be 365 days 5 hours 55' 12"; and hence concluded, that in 104 years Calippus's period would err a whole day. He therefore multiplied the period by four, and from the product cast away an entire day. But even this does not restore the new and full moons to the same day throughout the whole period; but they are sometimes anticipated 1 day 8 hours 23' 29" 20". See ASTRONOMY, n° 14.

Julian PERIOD. See JULIAN.

PERIOD, in grammar, denotes a small compass of discourse, containing a perfect sentence, and distinguished at the end by a point, or full stop, thus (.); and in members or divisions marked by commas, colons, &c.

Father Buffier observes two difficulties in the use of the period, or point; i. e. in distinguishing it from the colon, or double point; and in determining justly the end of a period, or perfect sentence. It is remarked, that the supernumerary members of a period, separated from the rest by colons and semicolons, usually commence with a conjunction: yet it is true these same conjunctions sometimes rather begin new periods than supernumerary members of old ones. It is the sense of things, and the author's own discretion, that must make the proper distinction which of the two in effect it is. No rules will be of any service, unless this be admitted as one, that when what follows the conjunction is of as much extent as what precedes it, it is usually a new period; otherwise not.

The second difficulty arises hence, that the sense appears perfect in several short detached phrases, wherein it does not seem there should be periods; a thing frequent in free discourse: as, *We are all in suspense: make your proposals immediately: you will be to blame for detaining us longer.* Where it is evident, that simple phrases have perfect senses like periods, and ought to be marked accordingly; but that the shortness of the discourse making them easily comprehended, the pointing is neglected.

De Colonia defines period a short but perfect sentence, consisting of certain parts or members, depending one on another, and connected together by some common vinculum. The celebrated definition of Aristotle is, a period is a discourse which has a beginning, a middle, and an end, all visible at one view. Rhetoricians consider period, which treats of the structure of sentences, as one of the four parts of composition. The periods allowed in oratory are three: A period of two members, called by the Greeks *dicolos*, and by the Latins *bimembris*; a period of three members, *tricolos*, *trimembris*; and a period of four, *quadrimembris*, *tetralolos*. See PUNCTUATION.

PERIOD, in numbers, is a distinction made by a point or comma, after every sixth place, or figure; and is used in numeration, for the reader distinguishing and naming the several figures or places; which see under NUMERATION.

PERIOD, in medicine, is applied to certain diseases which have intervals, and returns, to denote an entire course or circle of such disease; or its progress from any state through all the rest till it return to the same again.

Galen describes period as a time composed of an intensification and remission; whence it is usually divided into two parts, the paroxysm or exacerbation, and remission.

In intermitting fevers, the periods are usually stated and regular; in other diseases, as the epilepsy, gout, &c. they are vague or irregular.

PERIOD, in oratory. See there, n° 47.

PERIODIC, or **PERIODICAL**, something that terminates and comprehends a period; such is a periodic month; being the space of time wherein the moon dispatches her period.

PERIOECI, *περιοικοι*, in geography, such inhabitants of the earth as have the same latitudes, but opposite longitudes, or live under the same parallel and the same meridian, but in different semicircles of that meridian, or in opposite points of the parallel. These have the same common seasons throughout the year, and the same phenomena of the heavenly bodies; but when it is noon-day with the one, it is midnight with the other, there being twelve hours in an east and west direction. These are found on the globe by the hour-index, or by turning the globe half round, that is, 180 degrees either way.

PERIOSTEUM, or **PERIOSTIUM**, in anatomy, a nervous vascular membrane, endued with a very quick sense, immediately surrounding, in every part, both the internal and external surfaces of all the bones in the body, excepting only so much of the teeth as stand above the gums, and the peculiar places on the bones, in which the muscles are inserted. It is hence divided into the external and internal periosteum; and where

it

Peripatetics.

it externally surrounds the bones of the skull, it is generally called the *pericranium*. See ANATOMY, n^o 4.

PERIPATETICS, philosophers, followers of Aristotle, and maintainers of the peripatetic philosophy; called also *Aristotelians*. Cicero says, that Plato left two excellent disciples, Xenocrates and Aristotle, who founded two sects, which only differed in name: the former took the appellation of *Academics*, who were those that continued to hold their conferences in the Academy, as Plato had done before; the others, who followed Aristotle, were called *Peripatetics*, from *περιπατω*, "I walk;" because they disputed walking in the Lyceum.

Ammonius derives the name Peripatetic from Plato himself, who only taught walking; and adds, that the disciples of Aristotle, and those of Xenocrates, were equally called Peripatetics; the one Peripatetics of the Academy, the other Peripatetics of the Lyceum: but that in time the former quitted the title Peripatetic for that of Academic, on account of the place where they assembled; and the latter retained simply that of Peripatetic. The greatest and best part of Aristotle's philosophy was borrowed from Plato. Serranus asserts, and says he could demonstrate, that there is nothing exquisite in any part of Aristotle's philosophy, dialectics, ethics, politics, physics, or metaphysics, but is found in Plato. And of this opinion are many of the ancient authors, such as Clemens Alexandrinus, &c. Gale attempts to show, that Aristotle borrowed a good deal of his philosophy, both physical, about the first matter, and metaphysical about the first being, his affections, truth, unity, goodness, &c. from the Scriptures; and adds from Clearchus, one of Aristotle's scholars, that he made use of a certain Jew, who assisted him therein.

Aristotle's philosophy preserved itself in *puris naturalibus* for a long time: in the earlier ages of Christianity, the Platonic philosophy was generally preferred; but this did not prevent the doctrine of Aristotle from forcing its way into the Christian church. Towards the end of the fifth century, it rose into great credit; the Platonics interpreting in their schools some of the writings of Aristotle, particularly his dialectics, and recommending them to young persons. This appears to have been the first step to that universal dominion which Aristotle afterwards obtained among the learned, which was at the same time much promoted by the controversies which Origen had occasioned. This father was zealously attached to the Platonic system; and therefore, after his condemnation, many, to avoid the imputation of his errors, and to prevent their being counted among the number of his followers, openly adopted the philosophy of Aristotle. Nor was any philosophy more proper for furnishing those weapons of subtle distinctions and captious sophisms, which were used in the Nestorian, Arian, and Eutychian controversies. About the end of the sixth century, the Aristotelian philosophy, as well as science in general, was almost universally decried; and it was chiefly owing to Boethius, who explained and recommended it, that it obtained a higher degree of credit among the Latins than it had hitherto enjoyed. Towards the end of the seventh century, the Greeks abandoned Plato to the monks, and gave themselves up entirely to the direc-

tion of Aristotle; and in the next century, the Peripatetic philosophy was taught everywhere in their public schools, and propagated in all places with considerable success. John Damascenus very much contributed to its credit and influence, by composing a concise, plain, and comprehensive view of the doctrines of the Stagirite, for the instruction of the more ignorant, and in a manner adapted to common capacities. Under the patronage of Photius, and the protection of Bardas, the study of philosophy for some time declined, but was revived again about the end of the ninth century. About the middle of the 11th century, a revolution in philosophy commenced in France; when several famous logicians, who followed Aristotle as their guide, took nevertheless the liberty of illustrating and modelling anew his philosophy, and extending it far beyond its ancient limits. In the 12th century, three methods of teaching philosophy were in use by different doctors: the first was the ancient and plain method, which confined its researches to the philosophical notions of Porphyry, and the dialectic system, commonly attributed to St Augustine, and in which were laid down this general rule, that philosophical inquiries were to be limited to a small number of subjects, lest, by their becoming too extensive, religion might suffer by a profane mixture of human subtilty with its divine wisdom. The second method was called the Aristotelian, because it consisted in explications of the works of that philosopher, several of whose books, being translated into Latin, were almost everywhere in the hands of the learned. The third was termed the free method, employed by such as were bold enough to search after truth, in the manner the most adapted to render their inquiries successful, without rejecting the succours of Aristotle and Plato. A reformed system of the Peripatetic philosophy was first introduced into the schools in the university of Paris, from whence it soon spread throughout Europe; and has subsisted in some universities even to this day, under the name of *school philosophy*. The foundation thereof is Aristotle's doctrine, often misunderstood, but oftener misapplied: whence the retainers thereto may be denominated *Reformed Peripatetics*. Out of these have sprung, at various times, several branches; the chief are, the THOMISTS, SCOTISTS, and NOMINALISTS. See these articles.

The Peripatetic system, after having prevailed with great and extensive dominion for many centuries, began rapidly to decline towards the close of the 17th, when the disciples of Ramus attacked it on the one hand, and it had still more formidable adversaries to encounter in Descartes, Gassendi, and Newton. See PHILOSOPHY.

PERIPATON, in antiquity, the name of that walk in the Lyceum where Aristotle taught, and whence the name of Peripatetics given to his followers.

PERIPETIA, in the drama, that part of a tragedy wherein the action is turned, the plot unravelled, and the whole concludes. See CATASTROPHE.

PERIPHERY, in geometry, the circumference of a circle, ellipsis, or any other regular curvilinear figure. See GEOMETRY.

PERIPHRAISIS, circumlocution, formed of *περι* "about," and *φρασις* "I speak," in rhetoric, a circuit or tour of words, much affected by orators, to avoid common and trite manners of expression. The periphrasis

Peripatetics
||
Periphrasis.

Periploca,
Peripneu-
mony.

phrasis is of great use on some occasions; and it is often necessary to make things be conceived which are not proper to name. It is sometimes polite to suppress the names, and only intimate or design them. These turns of expression are also particularly serviceable in oratory; for the sublime admitting of no direct citations, there must be a compass taken to insinuate the authors whose authority is borrowed. A periphrasis, by turning round a proper name to make it understood, amplifies and raises the discourse; but care must be taken it be not too much swelled, nor extended *mal à propos*; in which case it becomes flat and languid.— See CIRCUMLOCUTION and ORATORY.

Dictionary
of Plant-
ing, &c.

PERIPLOCA, Virginian silk, in botany: A genus of the digynia order, belonging to the pentandria class of plants; and in the natural method ranking under the 30th order, *Contortæ*. The nectarium surrounds the genitals, and sends out five filaments. There are five species, four of which are natives of warm climates, and can only be raised there. The fifth, however, is sufficiently hardy for this climate. The periploca is a fine climbing plant, that will wind itself with its ligneous branches about whatever tree, hedge, pale, or pole is near it; and will arise, by the assistance of such support, to the height of above 30 feet; and where no tree or support is at hand to wind about, it will knit or entangle itself together in a most complicated manner. The stalks of the older branches, which are most woody, are covered with a dark brown bark, whilst the younger shoots are more mottled with the different colours of brown and grey, and the ends of the youngest shoots are often of a light green. The stalks are round, and the bark is smooth. The leaves are the greatest ornament to this plant; for they are tolerably large, and of a good shining green colour on their upper surface, and cause a variety by exhibiting their under surface of an hoary cast. Their figure is oblong, or rather more inclined to the shape of a spear, as their ends are pointed, and they stand opposite by pairs on short footstalks. Their flowers afford pleasure to the curious examiner of nature. Each of them singly has a star-like appearance; for though it is composed of one petal only, yet the rim is divided into segments, which expand in such a manner as to form that figure. Their inside is hairy, as is also the nectarium which surrounds the petal. Four or five of the flowers grow together, forming a kind of umbel. They are of a chocolate colour, are small, and will be in blow in July and August, and sometimes in September. In the country where this genus grows naturally, they are succeeded by a long taper pod, with compressed seeds, having down to their tops.

The propagation of this climber is very easy; for if the cuttings are planted in a light moist soil, in the autumn or in the spring, they will readily strike root. Three joints at least should be allowed to each cutting: they should be the bottom of the preceding summer's shoot; and two of the joints should be planted deep in the soil. Another, and a never-failing method, is by layers; for if they are laid down in the ground, or a little soil only loosely thrown over the young preceding summer's shoots, they will strike root at the joints, and be good plants for removing the winter following.

PERIPNEUMONY, Περικνημονία, formed from περί "about," and πνεύμων "lungs," in medicine, an

inflammation of some part of the thorax, properly of the lungs; attended with an acute fever, and a difficulty of breathing. See MEDICINE, n° 184.

PERIRRHANTERIUM, a vessel of stone or brass which was filled with holy water, and with which all those were sprinkled who were admitted by the ancients to their sacrifices. Beyond this vessel no profane person was allowed to pass. We are told by some, that it was placed in the *Adytum*, or inmost recess of the temple; others say it was placed at the door, which indeed seems to be the most likely opinion. It was used both by Greeks and Romans, and has been evidently borrowed, like many other Pagan ceremonies, by the Church of Rome. The Hebrews also had a vessel for purification.

PERISCII, in geography, the inhabitants of either frigid zone, between the polar circles and the poles, where the sun, when in the summer signs, moves only round about them, without setting; and consequently their shadows in the same day turn to all the points of the horizon.

PERISTALTIC, a vermicular spontaneous motion of the intestines, performed by the contraction of the circular and longitudinal fibres of which the fleshy coats of the intestines are composed; by means whereof the chyle is driven into the orifices of the lacteal veins, and the fæces are protruded towards the anus.

PERISTYLE, in ancient architecture, a building encompassed with a row of columns on the inside.

PERITONÆUM, in anatomy, is a thin, smooth, and lubricous membrane, investing the whole internal surface of the abdomen, and containing most of the viscera of that part as it were in a bag. See ANATOMY, n° 89.

PERITROCHIUM, in mechanics, denotes a wheel, or circle, concentric with the base of a cylinder, and moveable together with it about its axis. See MECHANICS.

PERJURY, in law, is defined by Sir Edward Coke to be a crime committed when a lawful oath is administered, in some judicial proceeding, to a person who swears wilfully, absolutely, and falsely, in a matter material to the issue or point in question. In ancient times it was in some places punished with death; in others it made the false swearer liable to the punishment due to the crime he had charged the innocent person with; in others a pecuniary mulct was imposed. But though it escaped human, yet it was thought, amongst the ancients in general, that the divine vengeance would most certainly overtake it; and there are many severe inflictions from the hand of God upon record, as monuments of the abhorrence in which this atrocious crime is held by the Deity. The souls of the deceased were supposed to be employed in punishing perjured persons. Even the inanimate creation was thought to take revenge for this crime. The Greeks supposed that no person could swear falsely by Styx without some remarkable punishment; and that no person guilty of perjury could enter the cave of Palæmon at Corinth without being made a memorable example of divine justice. In Sicily, at the temple of the Palici, there were fountains called *Delli*, from which issued boiling water, with flames and balls of fire; and we are told that if any person swore falsely near them, he was instantly struck dumb, blind, lame,

Perirrhant-
erium
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Perjury.

Perjury. or dead, or was swallowed up by the waters. But although perjury was thus held in general abhorrence, notwithstanding the credit which was given to such accounts of divine inflictions, it was so much practised by the Greeks, that *Græca fides* became a proverb. Lovers perjuries, however, were supposed to pass unnoticed, or to be very slightly punished with blackness of the nails, a decayed tooth, or some small diminution of beauty.

The ancient philosophers, however, were so afraid of perjury, that even an oath before a judge was never admitted but for want of other proof. Plato's precept was, "Not to administer an oath wantonly, but on deep grounds, and with the strictest caution." Ulpian gives his opinion thus: "Some are forward to take oaths from a contempt of religion; others, from an extraordinary awe of the Divine Majesty, carry their fear to an unreasonable superstition; so make an equitable decision of a judge necessary." "No man will perjure himself (says Aristotle) who apprehends vengeance from Heaven and disgrace among men." Clinias was so very scrupulous, that rather than take an oath (though lawfully), he suffered the loss of three talents. Perjury, in the time of Philo Judeus, was abominated and capitally punished among the Jews; though since they have much degenerated, having been poisoned with the books of the Talmud, which says, "He who breaks his promissory oath, or any vows he enters into by the year, if he has a mind should be ineffectual and invalid, let him rise the last day of the year, and say, Whatever promises, oaths, and vows I may think fit to make in the year following, let them be null, void, and of no effect." Tract. iii. part 3. of the *Talmud*, in the treatise *Nedbarim*, ch. 4. And the modern Jews use the same artifice, thinking they may then lawfully deceive the Christians. See *Hieron. ex Didis Talmud*, c. 3. and *Magister Joannes de Concor. Legum*, tit. iv. c. 7.

In our law, no notice is taken of any perjury but such as is committed in some court of justice having power to administer an oath; or before some magistrate or proper officer invested with a similar authority, in some proceedings relative to a civil suit or a criminal prosecution: for it esteems all other oaths unnecessary at least, and therefore will not punish the breach of them. For which reason it is much to be questioned, how far any magistrate is justifiable in taking a voluntary affidavit in any extrajudicial matter, as is now too frequent upon every petty occasion; since it is more than possible that, by such idle oaths, a man may frequently, in *foro conscientie*, incur the guilt, and at the same time evade the temporal penalties of perjury. The perjury must also be corrupt (that is, committed *malo animo*), wilful, positive, and absolute; not upon surprise, or the like: it also must be in some point material to the question in dispute; for if it only be in some trifling collateral circumstance, to which no regard is paid, it is no more penal than in the voluntary extrajudicial oaths before mentioned. Subornation of perjury is the offence of procuring another to take such a false oath, as constitutes perjury in the principal. The punishment of perjury and subornation, at common law, has been various. It was anciently death; afterwards banishment, or cutting out the tongue; then forfeiture of goods; and now it is fine and imprisonment, and

never more to be capable of bearing testimony. But the statute 5 Elis. c. 9. (if the offender be prosecuted thereon) inflicts the penalty of perpetual infamy, and a fine of 40 l. on the suborner; and in default of payment, imprisonment for six months, and to stand with both ears nailed to the pillory. Perjury itself is thereby punished with six months imprisonment, perpetual infamy, and a fine of 20 l. or to have both ears nailed to the pillory. But the prosecution is usually carried on for the offence at common law; especially as, to the penalties before inflicted, the statute 2 Geo. II. c. 25. superadds a power for the court to order the offender to be sent to the house of correction for a term not exceeding seven years, or to be transported for the same period; and makes it felony, without benefit of clergy, to return or escape within the time. It has sometimes been wished, that perjury, at least upon capital accusations whereby another's life has been or might have been destroyed, was also rendered capital, upon a principle of retaliation; as it was universally by the laws of France. And certainly the odiousness of the crime pleads strongly in behalf of the French law. But it is to be considered, that there they admitted witnesses to be heard only on the side of the prosecution, and used the rack to extort a confession from the accused. In such a constitution, therefore, it was necessary to throw the dread of capital punishment into the other scale, in order to keep in awe the witnesses for the crown; on whom alone the prisoner's fate depended: so naturally does one cruel law beget another. But corporal and pecuniary punishments, exile, and perpetual infamy, are more suited to the genius of the English law; where the fact is openly discussed between witnesses on both sides, and the evidence for the crown may be contradicted and disproved by those of the prisoner. Where indeed the death of an innocent person has actually been the consequence of such wilful perjury, it falls within the guilt of deliberate murder, and deserves an equal punishment; which our ancient law in fact inflicted. But the mere attempt to destroy life by other means not being capital, there is no reason that an attempt by perjury should; much less that this crime should, in all judicial cases, be punished with death. For to multiply capital punishments lessens their effect, when applied to crimes of the deepest dye; and, detestable as perjury is, it is not by any means to be compared with some other offences, for which only death can be inflicted; and therefore it seems already (except perhaps in the instance of deliberate murder by perjury) very properly punished by our present law; which has adopted the opinion of Cicero, derived from the law of the twelve tables, *Perjurii pena divina, exitium; humana, dedecus*. See OATH.

PERIWIG. See PERRUKE.

PERIZONIUS (James), a very learned and laborious writer, was born at Dam in 1651. He became professor of history and eloquence at the university of Franeker, when, by his merit and learning, he made that university flourish. However, in 1693, he went to Leyden, where he was made professor of history, eloquence, and the Greek tongue; in which employment he continued till his death, which happened in 1715. He wrote many Dissertations, and other learned and curious works, particularly *Origines Babylonica et Egyptiaca*,

Perjury
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Perizonius.

Perizzites
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Pernio.

Ægyptiaca, 2 vols 8vo, &c. But the part of his labours which is the most generally known, and perhaps the most useful, is the notes which he wrote upon *Sancti Minerva*. That work, as published by Perizonius, certainly suggested the idea of Harris's *Hermes*; and we hesitate not to say, that our countryman has made hardly any improvement on the system of his master.

PERIZZITES, the ancient inhabitants of Palestine, mingled with the Canaanites. There is also great probability that they themselves were Canaanites; but having no fixed habitations, sometimes dispersed in one country and sometimes in another, they were for that reason called *Perizzites*, which signifies *scattered* or *dispersed*. *Pherazoth* stands for *hamlets* or *villages*. The *Perizzites* did not inhabit any certain portion of the land of Canaan; there were some of them on both sides the river Jordan, in the mountains, and in the plains. In several places of Scripture the Canaanites and *Perizzites* are mentioned as the two chief people of the country. It is said, for example, that in the time of Abraham and Lot the Canaanite and *Perizzite* were in the land (Gen. xiii. 7.) The Israelites of the tribe of Ephraim complained to Joshua that they were too much pent up in their possession (Josh. xvii. 15.): he bid them go, if they pleased, into the mountains of the *Perizzites*, and *Rephaims* or giants, and there clearing the land, to cultivate and inhabit it. Solomon subdued the remains of the Canaanites and *Perizzites* which the children of Israel had not rooted out, and made them tributary to him (1 Kings ix. 20, 21. and 2 Chr. viii. 7.) There is still mention made of the *Perizzites* in the time of Ezra (ix. 1.), after the return from the captivity of Babylon; and several Israelites had married wives from that nation.

PERKIN. See CYDERKIN, and HUSBANDRY, n° 238.

PERMEABLE, a term applied to bodies of so loose a texture as to let something pass through them.

PERMSKI, or PERMIA, a town of the Russian empire, and capital of a province of the same name, seated on the river Kama between the Dwina and the Oby; E. Long. 55. 50. N. Lat. 70. 26. The province is bounded on the north by the Samoiedes, on the west by Ziranina and Ulatka, and on the east by Siberia.

PERMUTATION, in commerce, the same with bartering. In the canon-law, permutation denotes the actual exchange of one benefice for another.

PERNAMBUCO, a province of Brazil, in South America, bounded on the north by Tamera, on the east by the ocean, on the south by Seregippa, and on the west by Tapuyers. It is about 200 miles in length and 150 in breadth. The Dutch became masters of it in 1630, but the Portuguese soon retook it from them. It produces a great quantity of sugar, and the best Brazil wood.

PERNIO, a kibe or chilblain, is a little ulcer, occasioned by cold in the hands, feet, heels, nose, and lips. It will come on when warm parts are too suddenly exposed to cold, or when parts from being too cold are suddenly exposed to a considerable warmth; and has always a tendency to gangrene, in which it frequently terminates. It most commonly attacks

children of a sanguine habit and delicate constitution; and may be prevented or removed by such remedies as invigorate the system, and are capable of removing any tendency to gangrene in the constitution.

PERONÆUS, in anatomy, is an epithet applied to some of the muscles of the perone or fibula. See ANATOMY, *Table of the Muscles*.

PERONES, a sort of high shoes which were worn not only by country people, but by men of ordinary rank at Rome. In the early times of the commonwealth they were worn even by senators; but at last they were disused by persons of figure, and confined to ploughmen and labourers. They were very rudely formed, consisting only of hides undressed, and reaching to the middle of the leg. Virgil mentions the perones as worn by a company of rustic soldiers on one foot only.

PERONNE, a strong town of France, in Picardy, capital of Santerre. It is said never to have been taken, though often besieged. It is seated on the river Somme, in E. Long. 3. 1. N. Lat. 44. 50.

PERORATION, in rhetoric, the epilogue or last part of an oration, wherein what the orator had insisted on through his whole discourse is urged afresh with greater vehemence and passion. The peroration consists of two parts. 1. Recapitulation; wherein the substance of what was diffused throughout the whole speech is collected briefly and cursorily, and summed up with new force and weight. 2. The moving the passions; which is so peculiar to the peroration, that the masters of the art call this part *sedes affectuum*. The passions to be raised are various, according to the various kinds of oration. In a panegyric, love, admiration, emulation, joy, &c. In an invective, hatred, contempt, &c. In a deliberation, hope, confidence, or fear. The qualities required in the peroration are, that it be very vehement and passionate, and that it be short; because, as Cicero observes, tears soon dry up. These qualities were well observed by Cicero, who never had an equal in the management of this part of an orator's province; for peroration was his masterpiece.

“Concerning peroration (says Dr Blair), it is needless to say much, because it must vary so considerably, according to the strain of the preceding discourse. Sometimes the whole pathetic part comes in most properly at the peroration. Sometimes, when the discourse has been entirely argumentative, it is fit to conclude with summing up the arguments, placing them in one view, and leaving the impression of them full and strong on the mind of the audience. For the great rule of a conclusion, and what nature obviously suggests, is, to place that last on which we choose that the strength of our cause should rest.

“In all discourses, it is a matter of importance to hit the precise time of concluding, so as to bring our discourse just to a point; neither ending abruptly and unexpectedly, nor disappointing the expectation of the hearers when they look for the close, and continuing to hover round and round the conclusion till they become heartily tired of us. We should endeavour to go off with a good grace; not to end with a languishing and drawling sentence, but to close with dignity and spirit, that we may leave the minds of the hearers warm;

*Leffures en
Bellas
Lettres.*

Perron
||
Perrault

warm, and dismiss them with a favourable impression of the subject and of the speaker."

PEROTIS, in botany: A genus of the digynia order, belonging to the triandria class of plants; and in the natural method ranking under the 4th order, *Gramina*. There is no calyx: the corolla consists of a bilabular gluma; the valves are oblong, acute, somewhat unequal, and terminating in a sharp beard: it has three capillary stamina; the antheræ incumbent; the styli capillary, and shorter than the corolla; the stigma feathery and divaricated. The corolla serves as a perianthium, including a single seed of an oblong linear shape.—Of this there is only one species; viz. plumosus, a native of America, and lately introduced into Kew Garden.

PERPENDICULAR, in geometry, a line falling directly on another line, so as to make equal angles on each side. See **GEOMETRY**.

PERPETUAL, something that endures always, or lasts for ever.

PERPETUAL Motion. See **MOVEMENT**.

PERPIGNAN, a considerable town of Roussillon, in France, with a strong citadel, an university, and a bishop's see. It is seated on the river Tet; over which there is an handsome bridge, partly in a plain, and partly on a hill. E. Long. 0. 43. N. Lat. 45. 18.

PERQUISITE, in a general sense, something gained by a place over and above the settled wages.

PERQUISITE, in law, is any thing gotten by a man's own industry, or purchased with his money; in contradistinction to what descends to him from his father or other ancestor.

PERRAULT (Claude), the son of an advocate in parliament, was born at Paris in 1613; and was bred a physician, though he never practised but among his relations, friends, and the poor. He discovered early a particular taste for the sciences and fine arts; of which he acquired a consummate knowledge without the assistance of a master: he excelled in architecture, painting, sculpture, mathematics, physics, and all those arts that relate to designing and mechanics. The entrance into the Louvre, which was designed by him, is, according to the judgment of Voltaire, one of the most august monuments of architecture in the world. M. Colbert put him upon translating Vitruvius into French; which he performed, and published it in 1673, folio, with figures from his own drawings; which are said to have been more exactly finished than the plates themselves. When the academy of sciences was established, he was one of its first members, and was chiefly depended on for mechanics and natural philosophy. His works are, *Memoires pour servir à l'Histoire naturelle des Animaux*, folio, 1676, with figures; *Essais de Physique*, 4 vols 12mo, 1688; *Recueil des plusieurs machines de nouvelle invention*, 4to, 1700, &c. He died in 1688.

PERRAULT (Charles), the brother of Claude, was born at Paris in 1626, with as great a genius for arts, and a greater for letters, than his brother. Colbert chose him first clerk of the buildings, of which he was superintendant, and afterward made him comptroller-general of the finances under him. He was one of the first members of the academy of the belles lettres and inscriptions, and was received into the French academy in 1671. His poem, *La Peinture*, printed in 1688, Vol. XIV. Part I.

was universally admired: that intitled *La siecle de Louis le Grand*, in which he exalted the modern authors above the ancient, was a prelude to a war with all the learned. After he had disengaged himself from this contest, he applied himself to draw up eulogies of several great men of the 17th century, with their portraits, of which he has collected 102. There are other esteemed works of Perrault.—Besides these there were two other brothers, *Peter* and *Nicholas*, who made themselves known in the literary world.

PERRON (James Davy Du), a cardinal distinguished by his abilities and learning, was born in the canton of Bern in 1556. He was educated by Julian Davy, his father, a very learned Calvinist, who taught him Latin and the mathematics; after which, he by himself became acquainted with the Greek and Hebrew, philosophy, and the poets. Philip Desportes, abbot of Tyron, made him known to Henry III. king of France, who conceived a great esteem for him. Some time after, Du Perron abjured Calvinism, and afterwards embraced the ecclesiastical function; and having given great proofs of his wit and learning, he was chosen to pronounce the funeral oration of Mary queen of Scots. After the murder of Henry III. he retired to the house of Cardinal de Bourbon, and took great pains in bringing back the Protestants to the church of Rome. Among others, he gained over Henry Spondanus, afterwards bishop of Pamiers. He also chiefly contributed to engage Henry IV. to change his religion; and that prince sent him to negotiate his reconciliation to the holy see, in which he succeeded. Du Perron was consecrated bishop of Evreux while he resided at Rome. On his return to France, he wrote, preached, and disputed against the reformed; particularly against Du Pleffis Mornay, with whom he had a public conference in the presence of the king at Fontainebleau. He was made cardinal in 1604 by pope Clement VIII. at the solicitation of Henry IV. who afterwards nominated him to the archbishopric of Sens. The king at length sent him to Rome with Cardinal Joyeuse, in order to terminate the disputes which had arisen between Paul V. and the Venetians. It is said that this pope had such an high opinion of the address of the cardinal Du Perron, that he used to say, "Let us pray to God to inspire the cardinal Du Perron, for he will persuade us to do whatever he pleases." After the death of Henry IV. he retired into the country, where he put the last hand to his works; and, setting up a printing-house, corrected every sheet himself. He died at Paris in 1618. His works were collected after his death, and published at Paris in 3 vols folio.

PERROT (Nicholas), Sieur d'Abancourt, one of the first geniuses of his age, was born at Chalons in 1606. After studying philosophy about three years, he was sent to Paris to follow the law. At eighteen years of age he was admitted advocate of parliament, and frequented the bar; but he soon conceived a distaste for it, and therefore discontinued his practice. This displeased an uncle, but whose favour he recovered by quitting the Protestant religion. He could not, however, he prevailed upon to take orders in the Romish church; and some years after, he had a desire to return to the religion he had abjured. But, that he might not do any thing rashly, he resolved to study philosophy and divinity. For that purpose he chose

Perron,
Perrot.

Perruke. chose for his master Mr Stuart a Scotsman and Lutheran, a man of great learning. Almost three years he spent in the most assiduous study; and then set out from Paris to Champagne, where he abjured the Roman Catholic, and once more embraced the Protestant religion. In 1637 he was admitted a member of the French academy; a little after which he undertook a translation of Tacitus. Whilst he was engaged in that laborious task, he retired to his small estate of Ablancourt, and lived there till his death in 1664. He was a man of fine understanding, of great piety and integrity, and of universal learning. Moreri has given a catalogue of his works, the greatest part of which consist of translations, which seemed rather originals.

PERRUKE, **PERUKE**, or *Periwig*, was anciently a name for a long head of natural hair; such, particularly, as there was care taken in the adjusting and trimming of. Menage derives the word rather fancifully from the Latin *pilus* "hair." It is derived, according to this critic, thus, *pilus*, *pelus*, *pelutus*, *peluticus*, *pelutica*, *perutica*, *peruca*, *perruque*. The Latins called it *coma*; whence part of Gaul took the denomination of *Gallia Comata*, from the long hair which the inhabitants wore as a sign of freedom. An ancient author says, that Absalom's perruke weighed 200 shekels.

The word is now used for a set of false hair, curled, buckled, and sewed together on a frame or cawl; anciently called *capillamentum* or "false perruke." It is doubted whether or not the use of perrukes of this kind was known among the ancients. It is true, they used false hair: Martial and Juvenal make merry with the women of their time, for making themselves look young with their borrowed hair; with the men who changed their colours according to the seasons; and with the dotards, who hoped to deceive the Destinies by their white hair. But these seem to have scarce had any thing in common with our perrukes; and were at best only composed of hair painted, and glued together. Nothing can be more ridiculous than the description Lampridius gives of the emperor Commodus's perruke: it was powdered with scrapings of gold, and oiled (if we may use the expression) with glutinous perfumes for the powder to hang by. In effect, the use of perrukes, at least in their present mode, is not much more than 160 years old; the year 1629 is reckoned the epocha of long perrukes, at which time they began to appear in Paris; from whence they spread by degrees through the rest of Europe. At first it was reputed a scandal for young people to wear them, because the loss of their hair at that age was attributed to a disease the very name whereof is a reproach; but at length the mode prevailed over the scruple, and persons of all ages and conditions have worn them, foregoing without any necessity the conveniences of their natural hair. It was, however, some time before the ecclesiastics came into the fashion: the first who assumed the perruke were some of the French clergy, in the year 1660; nor is the practice yet well authorized. Cardinal Grimaldi in 1684, and the bishop of Lavaur in 1688, prohibited the use of the perruke to all priests without a dispensation or necessity. M. Thiers has an express treatise, to prove the perruke indecent in an ecclesiastic, and directly contrary to the decrees and canons of councils. A priest's head, embellished

with artificial hair curiously adjusted, he esteems a monster in the church, nor can he conceive any thing so scandalous as an abbot with a florid countenance, heightened with a well-curled perruke.

PERRY (Captain John), was a famous engineer, who resided long in Russia, having been recommended to the czar Peter while in England, as a person capable of serving him on a variety of occasions relating to his new design of establishing a fleet, making his rivers navigable, &c. His salary in this service was 300 l. per annum, besides travelling expences and subsistence money on whatever service he should be employed, together with a further reward to his satisfaction at the conclusion of any work he should finish. After some conversation with the czar himself, particularly respecting a communication between the rivers Volga and Don, he was employed on that work for three summers successively; but not being well supplied with men, partly on account of the ill success of the czar's arms against the Swedes at the battle of Narva, and partly by the discouragement of the governor of Astracan, he was ordered at the end of 1707 to stop, and next year was employed in refitting the ships at Veronise, and 1709 in making the river of that name navigable; but after repeated disappointments, and a variety of fruitless applications for his salary, he at last quitted the kingdom, under the protection of Mr Whitworth, the English ambassador, in 1712: (See his narrative in the Preface to *The State of Russia*). In 1721 he was employed in stopping with success the breach at Dagenham, in which several other undertakers had failed; and the same year about the harbour at Dublin, to the objections against which he then published an Answer. He was author of *The State of Russia*, 1716, 8vo, and *An Account of the stopping of Dagenham Breach*, 1721, 8vo; and died Feb. 11. 1733.

PERRY, the name of a very pleasant and wholesome liquor extracted from pears, in the same manner as cyder is from apples. See the article **CYDER**; and **HUSBANDRY**, n° 227—238.

The best pears for perry, or at least the sorts which have been hitherto deemed the fittest for making this liquor, are so excessively tart and harsh, that no mortal can think of eating them as fruit; for even hungry swine will not eat them, nay hardly so much as smell them. Of these the Bosbury pear, the Bareland pear, and the horse pear, are the most esteemed for perry in Worcestershire, and the squash pear, as it is called, in Gloucestershire; in both which counties, as well as in some of the adjacent parts, they are planted in the hedge-rows and most common fields. There is this advantage attending pear-trees, that they will thrive on land where apples will not so much as live, and that some of them grow to such a size, that a single pear-tree, particularly of the Bosbury and the squash kind, has frequently been known to yield, in one season, from one to four hogsheads of perry. The Bosbury pear is thought to yield the most lasting and most vinous liquor. The John pear, the Harpary pear, the Drake pear, the Mary pear, the Lullum pear, and several others of the hardest kinds, are esteemed the best for perry, but the redder or more tawney they are, the more they are preferred. Pears, as well as apples, should be full-ripe before they are ground.

Perry
||
Persees.

Dr Beale, in his general advertisements concerning cyder, subjoined to Mr Evelyn's Pomona, disapproves of Palladius's saying, that perry will keep during the winter, but that it turns sour as soon as the weather begins to be warm; and gives, as his reasons for being of a contrary opinion, that he had himself tasted at the end of summer, a very brisk, lively, and vinous liquor, made of horse pears; that he had often tried the juice of the Bosbury pear, and found it both pleasanter and richer the second year, and still more so the third, though kept only in common hogsheds, and in but indifferent cellars, without being bottled; and that a very honest, worthy, and ingenious gentleman in his neighbourhood, assured him, as of his own experience, that it will keep a great while, and grow much the stronger for keeping, if put into a good cellar and managed with due care. He imputes Palladius's error to his possibly speaking of common eatable pears, and to the perry's having been made in a very hot country; but he would have ascribed it to a more real cause, perhaps, had he pointed out the want of a thorough regular fermentation, to which it appears plainly that the ancients were entire strangers; for all their vinous liquors were medicated by boiling before they were laid up in order to be kept.

PERSECUTION, is any pain or affliction which a person designedly inflicts upon another; and in a more restrained sense, the sufferings of Christians on account of their religion.

Historians usually reckon ten general persecutions, the first of which was under the emperor Nero, 31 years after our Lord's ascension; when that emperor having set fire to the city of Rome, threw the odium of that execrable action on the Christians, who under that pretence were wrapped up in the skins of wild beasts, and worried and devoured by dogs; others were crucified, and others burnt alive. The second was under Domitian, in the year 95. In this persecution St John the apostle was sent to the isle of Patmos, in order to be employed in digging in the mines. The third began in the third year of Trajan, in the year 100, and was carried on with great violence for several years. The fourth was under Antoninus the philosopher, when the Christians were banished from their houses, forbidden to show their heads, reproached, beaten, hurried from place to place, plundered, imprisoned, and stoned. The fifth began in the year 197, under the emperor Severus. The sixth began with the reign of the emperor Maximinus in 235. The seventh, which was the most dreadful persecution that had ever been known in the church, began in the year 250, in the reign of the emperor Decius, when the Christians were in all places driven from their habitations, stripped of their estates, tormented with racks, &c. The eighth began in the year 257, in the fourth year of the reign of the emperor Valerian. The ninth was under the emperor Aurelian, A. D. 274; but this was very inconsiderable: and the tenth began in the 19th year of Dioclesian, A. D. 303. In this dreadful persecution, which lasted ten years, houses filled with Christians were set on fire, and whole droves were tied together with ropes and thrown into the sea. See **TOLERATION**.

PERSEES, the descendants of a colony of ancient Persians, who took refuge at Bombay, Surat, and in

the vicinity of those cities, when their own country was conquered 1100 years ago by the Mahometan Arabs. They are a gentle, quiet, and industrious people, loved by the Hindoos, and living in great harmony among themselves. The consequence is, that they multiply exceedingly, whilst their countrymen in the province of Keman are visibly diminishing under the yoke of the Mahometan Persians. Of the manners and customs of this amiable race, we have the following account in Heron's elegant translation of Niebuhr's Travels.

"The Persees (says he) make common contributions for the aid of their poor, and suffer none of their number to ask alms from people of a different religion. They are equally ready to employ their money and credit to screen a brother of their fraternity from the abuses of justice. When a Persee behaves ill, he is expelled from their communion. They apply to trade, and exercise all sorts of professions.

"The Persees have as little knowledge of circumcision as the Hindoos. Among them, a man marries only one wife, nor ever takes a second, unless when the first happens to be barren. They give their children in marriage at six years of age; but the young couple continue to live separate, in the houses of their parents, till they attain the age of puberty. Their dress is the same as that of the Hindoos, except that they wear under each ear a tuft of hair, like the modern Persians. They are much addicted to astrology, altho' very little skilled in astronomy.

"They retain the singular custom of exposing their dead to be eaten by birds of prey, instead of interring or burning them. I saw (continues our author) on a hill at Bombay a round tower, covered with planks of wood, on which the Persees lay out their dead bodies. When the flesh is devoured, they remove the bones into two chambers at the bottom of the tower.

"The Persees, followers of the religion of Zerdust or Zoroaster, adore one God only, eternal and almighty. They pay, however, a certain worship to the sun, the moon, the stars, and to fire, as visible images of the invisible divinity. Their veneration for the element of fire induces them to keep a sacred fire constantly burning, which they feed with odoriferous wood, both in the temples and in the houses of private persons, who are in easy circumstances. In one of their temples at Bombay, I saw a fire which had burnt unextinguished for two centuries. They never blow out a light, lest their breath should soil the purity of the fire. See **POLYTHEISM**.

"The religion of the Persees enjoins purifications as strictly as that of the Hindoos. The disciples of Zerdust are not, however, obliged to abstain from animal food. They have accustomed themselves to refrain from the flesh of the ox, because their ancestors promised the Indian prince who received them into his dominions never to kill horned cattle. This promise they continue to observe under the dominion of Christians and Mahometans. The horse is by them considered as the most impure of all animals, and regarded with extreme aversion.

"Their festivals, denominated *Ghumbars*, which return frequently, and last upon each occasion five days, are all commemorations of some part of the work of creation. They celebrate them not with splendour, or

Persees, Persepolis. with any particular ceremonies, but only dress better during those five days, perform some acts of devotion in their houses, and visit their friends."

The Persees were till lately but very little known: the ancients speak of them but seldom, and what they say seems to be dictated by prejudice. On this account Dr Hyde, who thought the subject both curious and interesting, about the end of last century attempted a deeper investigation of a subject which till then had been but very little attended to. He applied to the works of Arabian and Persian authors, from whom, and from the relations of travellers, together with a variety of letters from persons in India, he compiled his celebrated work on the religion of the Persees. Other accounts have been given by different men, as accident put information in their way. But the most distinguished is by M. Anquetil du Perron, who undertook a voyage to discover and translate the works attributed to Zoroaster. Of this voyage he drew up an account himself, and read it before the Royal Academy of Sciences at Paris in May 1761. A translation of it was made and published in the Gentleman's Magazine for 1762, to which we refer our readers. The account begins at p. 373, and is concluded at p. 614. Remarks were afterwards made on Du Perron's account by a Mr Yates. See the same Magazine for 1766, p. 529.

Plate
ccclxxxix.

PERSEPOLIS, formerly the capital of Persia, situated in N. Lat. 30. 30. E. Long. 84. now in ruins, but remarkable for the most magnificent remains of a palace or temple that are to be found throughout the world.—This city stood in one of the finest plains in Persia, being 18 or 19 leagues in length, and in some places two, in some four, and in others six leagues in breadth. It is watered by the great river Araxes, now Bendemir, and by a multitude of rivulets besides. Within the compass of this plain, there are between 1000 and 1500 villages, without reckoning those in the mountains, all adorned with pleasant gardens, and planted with shady trees. The entrance of this plain on the west side has received as much grandeur from nature, as the city it covers could do from industry or art. It consists of a range of mountains steep and high, four leagues in length, and about two miles broad, forming two flat banks, with a rising terrace in the middle, the summit of which is perfectly plain and even, all of native rock. In this there are such openings, and the terraces are so fine and so even, that one would be tempted to think the whole the work of art, if the great extent, and prodigious elevation thereof, did not convince one that it is a wonder too great for aught but nature to produce. Undoubtedly these banks were the very place where the advanced guards from Persepolis took post, and from which Alexander found it so difficult to dislodge them. One cannot from hence descry the ruins of the city, because the banks are too high to be overlooked; but one can perceive on every side the ruins of walls and of edifices, which heretofore adorned the range of mountains of which we are speaking. On the west and on the north this city is defended in the like manner: so that, considering the height and evenness of these banks, one may safely say, that there is not in the world a place so fortified by nature.

The mountain Rehumut, in the form of an amphitheatre, encircles the palace, which is one of the noblest and most beautiful pieces of architecture remaining of all antiquity. Authors and travellers have been exceedingly minute in their descriptions of those ruins; and yet some of them have expressed themselves so differently from others, that, had they not agreed with respect to the latitude and longitude of the place, one would be tempted to suspect that they had visited different ruins. These ruins have been described by Gercias de Silva Figueroa, Pietro de la Valle, Chardin, Le Brun, and Mr Francklin. We shall adopt the latest description, as being exceedingly distinct, and given by a traveller intelligent and unassuming. The ascent to the columns is by a grand staircase of blue stone containing 104 steps.

"The first object that strikes the beholder on his entrance, are two portals of stone, about 50 feet in height each; the sides are embellished with two sphinxes of an immense size, dressed out with a profusion of bead-work, and, contrary to the usual method, they are represented standing. On the sides above are inscriptions in an ancient character, the meaning of which no one hitherto has been able to decypher.

"At a small distance from these portals you ascend another flight of steps, which lead to the grand hall of columns. The sides of this staircase are ornamented with a variety of figures in basso relievo; most of them have vessels in their hands: here and there a camel appears, and at other times a kind of triumphal car, made after the Roman fashion; besides these are several led horses, oxen, and rams, that at times intervene and diversify the procession. At the head of the staircase is another basso relievo, representing a lion seizing a bull; and close to this are other inscriptions in ancient characters. On getting to the top of this staircase, you enter what was formerly a most magnificent hall; the natives have given this the name of *chebul minâr*, or forty pillars; and though this name is often used to express the whole of the building, it is more particularly appropriated to this part of it. Although a vast number of ages have elapsed since the foundation, 15 of the columns yet remain entire; they are from 70 to 80 feet in height, and are masterly pieces of masonry: their pedestals are curiously worked, and appear little injured by the hand of time. The shafts are enfluted up to the top, and the capitals are adorned with a profusion of fretwork.

"From this hall you proceed along eastward, until you arrive at the remains of a large square building, to which you enter through a door of granite. Most of the doors and windows of this apartment are still standing; they are of black marble, and polished like a mirror: on the sides of the doors, at the entrance, are bas-reliefs of two figures at full length; they represent a man in the attitude of stabbing a goat: with one hand he seizes hold of the animal by the horn, and thrusts a dagger into his belly with the other; one of the goat's feet rests upon the breast of the man, and the other upon his right arm. This device is common throughout the palace. Over another door of the same apartment is a representation of two men at full length; behind them stands a domestic holding a spread umbrella: they are supported by large round staffs, ap-

pear.

Persepolis *Perfia.* appear to be in years, have long beards, and a profusion of hair upon their heads.

"At the south-west entrance of this apartment are two large pillars of stone, upon which are carved four figures; they are dressed in long garments, and hold in their hands spears 10 feet in length. At this entrance also the remains of a staircase of blue stone are still visible. Vast numbers of broken pieces of pillars, shafts, and capitals, are scattered over a considerable extent of ground, some of them of such enormous size, that it is wonderful to think how they could have been brought whole, and set up together. Indeed, every remains of these noble ruins indicate their former grandeur and magnificence, truly worthy of being the residence of a great and powerful monarch."

These noble ruins are now the shelter of beasts and birds of prey. Besides the inscription above-mentioned, there are others in Arabic, Persian, and Greek. Dr Hyde observes, that the inscriptions are very rude and unartful; and that some, if not all of them, are in praise of Alexander the Great; and therefore are later than that conqueror. See the article RUINS.

PERSEVERANCE, in theology, a continuance in a state of grace to a state of glory.

About this subject there has been much controversy in the Christian church. All divines, except Unitarians, admit, that no man can ever be in a state of grace without the co-operation of the spirit of God; but the Calvinists and Arminians differ widely as to the nature of this co-operation. The former, at least such as call themselves the *true disciples of Calvin*, believe, that those who are once under the influence of divine grace can never fall totally from it, or die in mortal sin. The Arminians, on the other hand, contend, that the whole of this life is a state of probation; that without the grace of God we can do nothing that is good; that the Holy Spirit assists, but does not overpower, our natural faculties; and that a man, at any period of his life, may resist, grieve, and even quench, the spirit. See THEOLOGY.

PERSEUS was the most ancient of all the Greek heroes. He founded the city of Mycenæ, of which he became afterwards king, and where he and his posterity reigned for 100 years. He flourished, according to most chronologists, 1348 B. C. but, according to Sir Isaac Newton, only 1028.

PERSEUS, in astronomy. See there, n° 406.

Extent of Persia. PERSIA, a most ancient and celebrated empire of Asia, extending in length from the mouth of the river Araxes to that of the river Indus, about 1840 of our miles, and in breadth from the river Oxus, to the Persian gulph, about 1080 of the same miles. It is bounded on the north by the Caspian Sea, the river Oxus, and mount Caucasus; on the east, by the river Indus and the dominions of the Great Mogul; on the south, by the Persian gulph and the Indian ocean; and on the west, by the dominions of the Grand Signior.

Persia properly the name of only one province of this vast empire. We learn from Sir William Jones, the illustrious president of the Asiatic Society, that Persia is the name of only one province of this extensive empire, which by the present natives, and all the learned *Musulmans* who reside in the British territories in India, is called *Irân*. It has been a practice not uncommon in all ages to denominate the whole of a country from

that part of it with which we are best acquainted; and hence have the Europeans agreed to call Irân by the name of that province of which Shirauz is the capital: See SHIRAUZ. The same learned writer is confident that Irân, or Persia in its largest extent, comprehended within its outline the lower Asia, which, says he, was unquestionably a part of the *Persian*, if not of the old Assyrian empire. "Thus may we look on Irân as the noblest peninsula on this habitable globe; and if M. Bailly had fixed on it as the *Atlantis* of PLATO, he might have supported his opinion with far stronger arguments than any that he has adduced in favour of *Nova Zembla*. If, indeed, the account of the Atlantis be not purely an Egyptian fable, I should be more inclined, says Sir William, to place them in Irân than in any region with which I am acquainted."

The most ancient name, however, of this country was that of *Elam*, or, as some write it, *Ælam*, from Elam the son of Shem, from whom its first inhabitants are descended. Herodotus calls its inhabitants *Cephenes*; and in very ancient times the people are said to have called themselves *Artai*, and the country where they dwelt *Artæa*. In the books of Daniel, Esdras, &c. it is called by the names of *Pars*, *Pharas*, or *Fars*, whence the modern name of *Persia*; but whence those names have been derived, is now uncertain.

That Persia was originally peopled by Elam the son of Shem, has been very generally admitted; but the truth is, that of the ancient history of this distinguished empire very little is perfectly known. For this ignorance, which at first seems strange, satisfactory reasons may easily be assigned; of which the principal are the superficial knowledge of the *Greeks* and *Jews*, and the loss of Persian archives or historical compositions. "That the Grecian writers before XENOPHON had no acquaintance with *Persia*, and that their accounts of it are wholly fabulous, is a paradox too extravagant to be seriously mentioned; but (says Sir William Jones) their connection with it in war or peace had been generally confined to bordering kingdoms under feudatory princes; and the first *Persian* emperor, whose life and character they seem to have known with tolerable accuracy, was the great CYRUS." Our learned author, however, is so far from considering Cyrus as the first Persian monarch, that he thinks it evident a powerful monarchy had subsisted in Irân for ages before the accession of that hero; that this monarchy was called the *Mahébédiandynasty*; and that it was in fact the oldest monarchy in the world. The evidence upon which the president rests this opinion, is the work of a Mahometan traveller, compiled from the books of such Persians as fled from their country upon the innovation in religion made by Zoroaster; and if these books, of which a few still remain, be genuine, and the Mahometan a faithful compiler, facts of which Sir William has not the smallest doubt, the evidence is certainly sufficient to bear the superstructure which he has raised upon it.

If the Persian monarchy was thus ancient, it is natural to suppose that Persia or Irân was the original seat of the human race, whence colonies were sent out or emigrated of themselves to people the rest of the habitable globe. This supposition is actually made by our ingenious author, who strongly confirms it by remarks.

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marks on the most ancient language of Persia, which he shows to have been the parent of the *Sanſcrit*, as well as of the Greek, Latin, and Gothic (see *PHILOLOGY*). He therefore holds, as a proposition firmly established, "that *Iràn* or Persia, in its largest sense, was the true centre of population, of knowledge, of languages, and of arts; which instead of travelling westward only, as it has been fancifully supposed, or eastward, as might with equal reason have been asserted, were expanded in all directions to all the regions of the world." He thinks it is from good authority that the Saxon Chronicle brings the first inhabitants of Britain from Armenia; that the Goths have been concluded to come from Persia; and that both the Irish and old Britons have been supposed to have proceeded from the borders of the Caspian: for all these places were comprehended within the ancient *Iràn*.

6

Accounts of
the birth,
&c. of Cy-
rus.

Of this first Persian monarchy we have no historical accounts; and must therefore, after having thus mentioned it, descend at once to the era of Cyrus. This prince is celebrated both by sacred and profane historians; but the latter are at no small variance concerning his birth and accession to the throne. According to Herodotus, Astyages, the last king of the Medes, being warned in a dream, that the son who was to be born of his daughter Mandane, should one day be lord of Asia, resolved to marry her, not to a Mede, but to a Persian. Accordingly he chose for her husband one Cambyſes, a man of a peaceable disposition, and of no very high station. However, about a year after they were married, Astyages was frightened by another dream, which made him resolve to dispatch the infant as soon as it should be born. Hereupon the king sent for his daughter, and put her under confinement, where she was soon after delivered of a son. The infant was committed to the care of one Harpagus, with strict orders to destroy it in what manner he thought proper. But he, having acquainted his wife with the command he had received, by her advice gave it to a shepherd, desiring him to let it perish by exposing it. But the shepherd, out of compassion, exposed a still-born child which his wife happened to be then delivered of, and brought up the son of Mandane as his own, giving him the name of CYRUS.

When the young prince had attained the age of ten years, as he was one day at play with other children of the same age, he was chosen king by his companions; and having, in virtue of that dignity, divided them into several orders and classes, the son of Artembares, a lord of eminent dignity among the Medes, refused to obey his orders; whereupon Cyrus caused him to be seized, and whipped very severely. The boy ran crying to his father; and he immediately hastened to the king's palace, loudly complaining of the affront his son had received from the son of a slave, and intreating Astyages to revenge, by some exemplary punishment, the indignity offered to him and his family. Astyages, commanding both the herdsman and his son to be brought before him, asked the latter, how he, who was the son of so mean a man, had dared to abuse the son of one of the chief lords of the kingdom? Cyrus replied, that he had done no more than he had a right to do; for the boys of the neighbourhood having chosen him king, because they thought him most worthy of that dignity, and performed what he, vested with

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that character, had commanded, the son of Artembares alone had slighted his orders, and for his disobedience had suffered the punishment he deserved. In the course of this conversation Astyages happening to recollect, that his grandson, whom he had ordered to be destroyed, would have been about the same age with Cyrus, began to question the shepherd concerning his supposed son, and at last obtained from him a confession of the whole truth.

Astyages having now discovered Cyrus to be his grandson, sent for Harpagus, who also confessed that he had not seen Mandane's son destroyed, but had given him to the shepherd; at which Astyages was so much incensed, that, having invited Harpagus to an entertainment, he caused him to be served with the flesh of his own son. When he had done, the king asked him whether he liked his victuals; and Harpagus answering, that he had never tasted any thing more delicious, the officers appointed for that purpose brought in a basket, containing the head, hands, and feet of his son, desiring him to uncover the basket, and take what he liked best. He did as they desired, and beheld the mangled remains of his only child without betraying the least concern, so great was the command which he had over his passions. The king then asked him, whether he knew with what kind of meat he had been entertained. Harpagus replied, that he knew very well, and was always pleased with what his sovereign thought fit to ordain; and having thus replied, with a surprising temper he collected the mangled parts of his innocent son, and went home.

Astyages having thus vented his rage on Harpagus, began next to consult what he should do with Cyrus. The magi, however, eased him of his fears with regard to him, by assuring him, that as the boy had been once chosen king by his companions, the dream had been already verified, and that Cyrus never could reign in any other sense. The king, being well pleased with this answer, called Cyrus, and, owning how much he had been wanting in the affection which he ought to have had towards him, desired him to prepare for a journey into Persia, where he would find his father and mother in circumstances very different from those of the poor shepherd and his wife with whom he had hitherto lived. Cyrus, on his arrival at his father's house, was received with the greatest joy. When he grew up, he soon became popular on account of his extraordinary parts; till at last his friendship was courted by Harpagus, who had never forgot the cruel treatment he received from Astyages. By his means a conspiracy was formed against Astyages; who being overthrown in two successive engagements, was taken prisoner and confined for life.

The account given by Xenophon of the rise of Cyrus is much more consonant to Scripture; for he tells us, that Babylon was conquered by the united forces of the Medes and Persians. According to him, Cyrus was the son of Cambyſes king of the Medes, and Mandane the daughter of Astyages king of Persia. He was born a year after his uncle Cyaxares, the brother of Mandane. He lived till the age of twelve with his parents in Persia, being educated after the manner of the country, and inured to fatigues and military exercises. At this age he was taken to the court of Astyages, where he resided four years; when the re-

Persia.

7
His war
with the
Lydians.

volt of the Medes and Persians from the Babylonians happened, and which ended in the destruction of the Babylonish empire, as related under the article BABEL.

While Cyrus was employed in the Babylonish war, before he attacked the metropolis itself, he reduced all the nations of Asia Minor. The most formidable of these were the Lydians, whose king Cræsus assembled a very numerous army, composed of all the other nations in that part of Asia, as well as of Egyptians, Greeks, and Thracians. Cyrus being informed of these vast preparations, augmented his forces to 196,000 men, and with them advanced against the enemy, who were assembled near the river Pactolus. After long marches, he came up with them at Thymbra, not far from Sardis, the capital of Lydia. Besides the horse and foot, which amounted to 196,000, as already observed, Cyrus had 300 chariots armed with scythes, each chariot drawn by four horses abreast, covered with trappings that were proof against all sorts of missile weapons: he had likewise a great number of chariots of a larger size, upon each of which was placed a tower about 18 or 20 feet high, and in each tower were lodged 20 archers. These towers were drawn by 16 oxen yoked abreast. There was moreover a considerable number of camels, each mounted by two Arabian archers, the one looking towards the head, and the other towards the hinder part of the camel. The army of Cræsus consisted of 420,000 men. The Egyptians, who alone were 120,000 in number, being the main strength of the army, were placed in the centre. Both armies were drawn up in an immense plain, which gave room for the extending of the wings on either side; and the design of Cræsus, upon which alone he founded his hopes of victory, was to surround and hem in the enemy's army.

8
The battle
of Thym-
bra.

When the two armies were in sight of each other, Cræsus, observing how much his front exceeded that of Cyrus, made the centre halt, but commanded the two wings to advance, with a design to inclose the Persian army, and begin the attack on both sides at once. When the two detached bodies of the Lydian forces were sufficiently extended, Cræsus gave the signal to the main body, which marched up to the front of the Persian army, while the two wings attacked them in flank; so that Cyrus's army was hemmed in on all sides, and, as Xenophon expresses it, was inclosed like a small square drawn within a great one. This motion, however, did not at all alarm the Persian commander; but, giving his troops the signal to face about, he attacked in flank those forces that were going to fall upon his rear so vigorously, that he put them into great disorder. At the same time a squadron of camels was made to advance against the enemy's other wing, which consisted mostly of cavalry. The horses were so frightened at the approach of these animals, that most of them threw their riders, and trod them under foot; which occasioned great confusion. Then Artageses, an officer of great valour and experience, at the head of a small body of horse, charged them so briskly, that they could never afterwards rally; and at the same time the chariots, armed with scythes, being driven in among them, they were entirely routed. Both the enemy's wings being thus put to flight, Cyrus commanded his chief favourite Abradates to

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fall upon the centre with the large chariots above-mentioned. The first ranks, consisting mostly of Lydians, not being able to stand so violent a charge, immediately gave way; but the Egyptians, being covered with their bucklers, and marching so close that the chariots had not room to penetrate their ranks, a great slaughter of the Persians ensued. Abradates himself was killed, his chariot overturned, and the greatest part of his men were cut in pieces. Upon his death, the Egyptians, advancing boldly, obliged the Persian infantry to give way, and drove them back quite to their engines. There they met with a new shower of darts and javelins from their machines; and at the same time the Persian rear advancing sword in hand, obliged their spearmen and archers to return to the charge. In the mean time Cyrus, having put to flight both the horse and foot on the left of the Egyptians, pushed on to the centre, where he had the misfortune to find his Persians again giving ground; and judging that the only way to stop the Egyptians, who were pursuing them, would be to attack them in the rear, he did so; and at the same time the Persian cavalry coming up to his assistance, the fight was renewed with great slaughter on both sides. Cyrus himself was in great danger; for his horse being killed under him, he fell among the midst of his enemies: but the Persians, alarmed at the danger of their general, threw themselves headlong on their opponents, rescued him, and made a terrible slaughter; till at last Cyrus, admiring the valour of the Egyptians, offered them honourable conditions: letting them know at the same time, that all their allies had abandoned them. They accepted the terms offered them; and having agreed with Cyrus that they should not be obliged to carry arms against Cræsus, they engaged in the service of the conqueror, and continued faithful to him ever after.

The next morning Cyrus advanced towards Sardis, Sardis taken, and Cræsus marched out to oppose him at the head of the Lydians only; for his allies had all abandoned him. Their strength consisted mostly in cavalry: which Cyrus being well apprised of, he ordered his camels to advance; by whom the horses were so frightened, that they became quite ungovernable. However, the Lydians dismounted, and for some time made a vigorous resistance on foot; but were at last driven into the city, which was taken two days after: and thus the Lydian empire was totally destroyed.

After the conquest of Sardis, Cyrus turned his arms against Babylon itself, which he reduced in the manner related under that article. Having settled the civil government of the conquered kingdoms, Cyrus took a review of all his forces, which he found to consist of 600,000 foot, 120,000 horse, and 2000 chariots armed with scythes. With these he extended his dominion all over the nations to the confines of Ethiopia, and to the Red Sea; after which he continued to reign peaceably over his vast empire till his death, which happened about 529 before Christ. According to Xenophon, he died a natural death; but others tell us, that, having engaged in a war with the Scythians, he was by them overthrown and cut in pieces with his whole army, amounting to 200,000 men. But this is very improbable, seeing all authors agree that the tomb of Cyrus was extant at Pasargada in Persia in the time of Alexander the Great; which it could not have been.

10
Reduces
Babylon.11
His death.

Persia.

if his body had remained in the possession of the Scythians, as these authors assert.

In the time of Cyrus, the Persian empire extended from the river Indus to the Ægean Sea. On the north it was bounded by the Euxine and Caspian Seas, and on the South by Ethiopia and Arabia. That monarch kept his residence for the seven cold months at Babylon, by reason of the warmth of that climate; three months in the spring he spent at Susa, and two at Ec-batan during the heat of summer. On his death-bed he appointed his son Cambyfes to succeed him in the empire; and to his other son, Smerdis, he gave several considerable governments. The new monarch immediately set about the conquest of Egypt; which he accomplished in the manner related in the history of that country.

12
Cambyfes
conquers
Egypt.

Having reduced Egypt, Cambyfes next resolved to turn his arms against the Carthaginians, Hammonians, and Ethiopians. But he was obliged to drop the first of these enterprizes, because the Phœnicians refused to supply him with ships against the Carthaginians, who were a Phœnician colony. However, he sent ambassadors into Ethiopia with a design to get intelligence of the state and strength of the country. But the Ethiopian monarch, being well apprised of the errand on which they came, treated them with great contempt. In return for the presents sent him by Cambyfes, he sent his own bow; and advised the Persians to make war upon the Ethiopians when they could bend such a strong bow as easily as he did, and to thank the gods that the Ethiopians had no ambition to extend their dominions beyond their own country.

13
His unsuc-
cessful ex-
pedition
against
Ethiopia
and the
Hammo-
nians.

Cambyfes was no sooner informed of this answer by his ambassadors than he flew into a violent passion; and ordered his army immediately to begin their march, without considering that they were neither furnished with provisions nor any other necessary. When he arrived at Thebes in Upper Egypt, he detached 50,000 men, with orders to destroy the temple of Jupiter Ammon: but all these perished in the desert; not a single person arriving either at the oracle, or returning to Thebes. The rest of the army, led by Cambyfes himself, experienced incredible hardships; for, not being provided with any necessaries, they had not marched a fifth part of the way when they were obliged to kill and eat their beasts of burthen. When these failed, the soldiers fed on grass and roots, as long as any could be found; and at last were reduced to the dreadful necessity of eating one another; every tenth man, on whom the lot fell, being condemned to serve as food for his companions. The king, however, obstinately persisted in his design; till, being apprehensive of the danger he himself was in, he retreated to Thebes, after having lost the greatest part of his army.

14
He murders
his brother.

Cambyfes was a man of a very cruel and suspicious temper, of which he gave many instances; and the following proved indirectly the cause of his death.—We have already observed that the king of Ethiopia sent his bow in return for the presents brought to him by the ambassadors of Cambyfes. The only man in the Persian army who could bend this bow was Smerdis the king's brother; and this instance of his personal strength so alarmed the tyrant, that, without any crime alleged, he caused him to be murdered. This

gave occasion to one Smerdis, a magian, who greatly resembled the other Smerdis in looks, to assume the name of the deceased prince, and to raise a rebellion against Cambyfes, who was generally hated for his cruelty; and this he could the more easily do, as the chief management of affairs had been committed to this Smerdis during the king's absence. Cambyfes, on receiving the news of this revolt, immediately ordered his army to march, in order to suppress it; but as he was mounting his horse, his sword, slipping out of its scabbard, wounded him in the thigh. On this accident, he asked the name of the city where he was; and being told that it was Ec-batan, he said in the presence of all his attendants, "Fate has decreed that Cambyfes the son of Cyrus shall die in this place." For, having consulted the oracle of Butus, which was very famous in that country, he was told that he should die at Ec-batan. This he had always understood of Ec-batan in Media, and had therefore resolved to avoid it. Being now, however, convinced that his end approached, he assembled the chief Persian lords who served in the army, and having told them that his brother was certainly dead, he exhorted them never to submit to the impostor, or suffer the sovereignty again to pass from the Persians to the Medes, to which nation Smerdis belonged, but to use their utmost endeavours to place one of their own blood on the throne.

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As the king's wound mortified, he lived but a few days after this; but the assembly supposing that he had spoken only out of hatred to his brother, quietly submitted to the impostor, who was thus for a time established on the throne. Indeed, from his conduct during the short time which he enjoyed the kingdom, he appears to have been not at all undeserving of a crown. He began with granting to all his subjects an exemption from taxes and military service for three years, and treated all of them in the most beneficent manner. To secure himself on the throne the more effectually, he married Atossa the daughter of Cyrus; thinking, that in case of a discovery he might hold the empire by her title. She had before been married to her brother Cambyfes, on a decision of the magi that a king of Persia might do as he pleased; and by virtue of this decision Smerdis also married her as her brother. The extreme caution of Smerdis, however, promoted the discovery of his imposture. He had married all his predecessor's wives, among whom was one Phedyma, the daughter of Otanes a Persian nobleman of the first rank. Otanes, who suspected that the king was not Smerdis the son of Cyrus, sent a trusty messenger to his daughter, desiring to know whether he was so or not; but Phedyma, having never seen this Smerdis, could not give any answer. Her father then desired her to inquire at Atossa, who could not but know her own brother. However, he was again disappointed; for Phedyma acquainted him that all the king's wives were lodged in distinct and separate apartments, without being allowed to see each other. This greatly increased the suspicions of Otanes; upon which he sent his daughter a third message, desiring her, the next time she should be admitted to the king's bed, to take an opportunity of feeling whether he had ears or not: for Cyrus had formerly caused the ears of Smerdis the magian to be cut off for some crime of which he had been

15
His death.

16
Reign of
Smerdis the
magian.

17
His im-
posture disco-
vered.

been

Perſia. been guilty; ſo that, if the king had ears, ſhe might then be aſſured that he was Smerdis the ſon of Cyrus. The event ſhewed that the ſuſpicions of Otanes were juſt; and Phedyma having acquainted her father that the king had no ears, a conſpiracy was immediately formed againſt him. While the conſpirators were debating about the proper means of carrying their deſigns into execution, Darius the ſon of Hyſtaſpes happening to arrive at Suſa where his father was governor, they all agreed to make him privy to their deſign. He told them, at their firſt meeting, that he thought nobody in the empire but himſelf had known that Smerdis the ſon of Cyrus was dead, and the throne uſurped by one of the magi; that he had come with a deſign to kill the uſurper, without imparting his deſign to any one, that the glory of ſuch an action might be entirely his own. But ſince others were apprized of the impoſture, he inſiſted that the uſurper ſhould be diſpatched without delay. Otanes, on the other hand, was for putting off the enterpriſe till ſome better opportunity offered; but Darius proteſted, that if they did not make the attempt that very day, he would prevent any one from accusing him, by diſcloſing the whole matter to the impoſtor himſelf.

18
A conſpiracy formed againſt him.

In the mean time, Smerdis and his brother had by great promiſes prevailed on Prenaspes (the executioner of the true Smerdis) to bind himſelf by an oath not to diſcover the fraud they had put on the Perſians, and even to make a public ſpeech, declaring that the preſent king of Perſia was really the ſon of Cyrus. At the time appointed, he began his diſcourſe with the genealogy of Cyrus, putting his hearers in mind of the great favours the nation had received from that prince. After having extolled Cyrus and his family, to the great aſtoniſhment of all preſent, he confeſſed the whole tranſaction with regard to the death of Smerdis; telling the people, that the apprehenſions of the danger he muſt inevitably run by publiſhing the impoſture had conſtrained him to conceal it ſo long; but now, not being able any longer to act ſuch a diſhonourable part, he acknowledged that he had been compelled by Cambyſes to put his brother to death with his own hand, and that the perſon who poſſeſſed the throne was Smerdis the magian. He then begged pardon of the gods and men for the crime he had committed; and fulminating many imprecations againſt the Perſians if they failed to recover the ſovereignty, he threw himſelf headlong from the top of the tower on which he ſtood, and died on the ſpot.

19
He is killed.

In the mean time the conſpirators, who were advancing towards the palace, were informed of what had happened; and Otanes was again for deſerring the execution of their enterpriſe: but Darius inſiſting upon the danger of delay, they proceeded boldly to the palace; and being admitted by the guards, who did not ſuſpect them, they killed both the uſurper and his brother; after which they expoſed their heads to the people, and declared the whole impoſture. The Perſians at this were ſo enraged, that they fell on the whole ſect, and killed every one of the magi they could meet with; and had not the ſlaughter been ſtopped by night, not one of the order would have been left alive. The day on which this ſlaughter happened was afterwards celebrated by the Perſians with the greateſt ſolemnity, and called by the name of *Magophonia*, or

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the ſlaughter of the Magi. On that feſtival the magi durſt not appear abroad, but were obliged to ſhut themſelves up in their houſes. Smerdis the magian reigned only eight months.

When the tumult was a little ſubſided, the conſpirators, who were ſeven in number, met together in order to elect a new king, or to determine what form of government they ſhould next introduce. Otanes was for a republic: but being over-ruled by the reſt, he declared, that as he was determined not to be a king, neither would he be ruled by one; and therefore inſiſted that he and his family ſhould ever afterwards remain free from ſubjection to the royal power. This was not only granted, but it was further agreed by the other ſix, that whoever was choſen ſhould every year preſent Otanes with a Median veſt, a mark of great diſtinction among the Perſians, becauſe he had been the chief author of the enterpriſe. They further agreed to meet at a certain place next morning at ſunriſe on horſeback, and that he whoſe horſe firſt neighed ſhould be king. This being overheard by Oebores, who had the care of Darius's horſes, he led a mare over-night to the place, and brought his maſter's horſe to her. The next morning, the horſe remembering the place, immediately neighed for the mare; and the five lords diſmounting, ſaluted Darius as their king.

20
Darius Hyſtaſpes choſen king.

Darius Hyſtaſpes was elected king of Perſia in the year 522 B. C. Immediately after his acceſſion, he promoted the other ſix conſpirators to the firſt employments in the kingdom, married the two daughters of Cyrus, Atossa and Artystona, Parmys the daughter of the true Smerdis, and Phedyma the daughter of Otanes, who had detected the impoſture of the magian. He then divided the whole empire into 20 ſatrapies or governments, and appointed a governor over each diviſion, ordering them to pay him an annual tribute. The inhabitants of Colchis, with ſome others, were enjoined only to make annual preſents, and the Arabians to furniſh every year ſuch a quantity of frankincenſe as equalled the weight of 1000 talents. Thus Darius received the yearly tribute of 14,560 Eubæic talents, upwards of 260,000 pounds ſterling.

Under Darius, the building of the temple of Jeruſalem, which had been obſtructed by Cambyſes and Smerdis, went on ſucceſſfully, and the Jewiſh ſtate was entirely reſtored. The moſt remarkable of Darius's other tranſactions were his expeditions againſt Baſylon; againſt Scythia, India, and Greece. The expedition againſt Babylon took place in the year 517 B. C. when the people, unable to bear the oppreſſion of the Perſians, and likewiſe diſcontented becauſe the ſeat of government was removed from their city to Suſa in Perſia, took the opportunity of the troubles which happened in the reigns of Cambyſes and Smerdis, to ſtore their city with all kinds of proviſions ſufficient to ſerve them for many years; after which they broke out into an open rebellion, and this quickly brought upon them Darius with all his forces. The Babylonians perceiving themſelves ſhut up by ſo numerous an army, turned all their thoughts towards the ſupporting of a long ſiege, which they imagined would tire out the king's troops. To prevent the conſumption of their proviſions, they took the moſt barbarous and cruel reſolution that ever was put in execution by any nation. They agreed among themſelves to get rid of all unneceſſary

21
Revolt of the Baby- lonians.

Persia.

cessary mouths; and therefore, gathering together all the old men, women, and children, they strangled them without distinction; every one being allowed only to keep the wife he liked best, and a maid-servant to do the work of the house. The siege continued for a year and eight months; nor was there any likelihood of its being ended, when Zopyrus, one of Darius's chief commanders, put him in possession of it by the following stratagem. He cut off his nose and ears, and having mangled his body with stripes in a most cruel manner, he fled to the Babylonians thus disfigured, pretending that he had been so treated by Darius for advising him to raise the siege. Being intrusted with the command of some forces, he cut off several parties of the Persian army, whom Darius thus sacrificed in order to raise the character of Zopyrus the higher among the Babylonians. In this manner he so much established his credit, that at last he was made commander in chief of all the Babylonish forces, and the guard of the city committed entirely to his care; and no sooner was this done than he delivered it up to Darius, who, to prevent their rebelling a second time, beat down the walls of that metropolis to the height of 50 cubits. Three thousand of the most active in the rebellion were impaled; the rest pardoned. As they had destroyed most of their women, the neighbouring nations were commanded to furnish them with wives, and 50,000 women were sent to that city, by which means it was prevented from being depopulated. Zopyrus was rewarded with the highest honours, and had the whole revenues of Babylon bestowed on him for life.

22

His unsuccessful expedition against the Scythians.

After the reduction of Babylon Darius undertook a Scythian expedition, directed against those nations which lie between the Danube and the Tanais. His pretext for this war was, to revenge the calamities which these nations had brought upon Asia about 120 years before, when they invaded and subdued Media; keeping it in subjection for the space of 28 years, as we have related under that article. In this expedition he was attended with an army of 700,000 men. With these he marched to the Thracian Bosphorus; which having passed on a bridge of boats, he reduced all Thrace. From Thrace he advanced to the Danube, where he had appointed his fleet to meet him. This river he passed on another bridge of boats, and entered Scythia. His enemies, however, were too wise to oppose such a formidable power in the open field; and therefore retired before him, wasting the country as they went along, till at last the king, sensible of the danger he was in, resolved to give over the enterprise and return home. In order to do so with safety, he lighted a great number of fires in the night-time, and decamped; leaving behind him the old men and the sick, who fell into the hands of their enemies. The Scythians perceiving that Darius was gone, detached a considerable body to the bridge over the Danube; and as they were well acquainted with the roads, they got thither before the Persians. The Scythians had sent express before-hand to persuade the Ionians, whom Darius had left to guard the bridge, to break it down and retire to their own country; and this they pressed the more earnestly, that as the time prescribed by Darius was now expired, they were at liberty to return home, without breaking their word or being

wanting in their duty. Miltiades, prince of the Chersonesus of Thrace, was for embracing so favourable an opportunity of cutting off Darius's retreat, and shaking off the Persian yoke at once: all the other commanders agreed with him, except Hyftiaeus prince of Miletus; who represented to the Ionian chiefs, that their power was connected with that of Darius, since it was under his protection that each of them was lord in his own city; and that the cities of Ionia would not fail to depose them and recover their liberty, if the Persian power should sink or decline. This speech made a deep impression on the rest, and it was at last determined that they should wait for Darius; and in order to deceive the Scythians, they began to break down the bridge, but advised them to return back and defeat Darius. They did so, but missed him; and he having thus safely escaped so great a danger, immediately repassed the Bosphorus, and took up his winter-quarters at Sardis, leaving Megabyzus, one of his chief generals, to complete the conquest of Thrace.

Persia.

The king having sufficiently refreshed his troops, He con- who had suffered extremely in the Scythian expedition, quers India, began to think of extending his dominions eastward; and, in order to facilitate his design, resolved in the first place to discover those countries. With this view, he caused a fleet to be built and equipped at Capatyrus, a city on the river Indus. The command of this fleet he gave to one Scylax, a Grecian of Caryandia a city of Caria, who was well versed in maritime affairs. Him he ordered to sail down the current, and make the best discoveries he could of the countries lying on either side of the river, till he arrived at the southern ocean; from whence he was to steer his course westward, and that way return to Persia. Scylax, having exactly observed his instructions, and sailed down the river Indus, entered the Red Sea by the straits of Babelmandel, and on the 30th month from his first setting out, landed at the same place from whence Nechu king of Egypt formerly sent out the Phœnicians who circumnavigated Africa. From hence Scylax returned to Susa, where he gave a full account of his discoveries; upon which Darius, marching into India at the head of a powerful army, reduced that large country, and made it a province of the Persian empire, drawing from thence an annual tribute of 360 talents of gold.

24

Soon after the expedition of Darius against India Revolt of the Ionians, &c. happened the revolt of the Ionians, which gave occasion to his expedition into Greece; an account of which is given under the articles ATTICA, GREECE, SPARTA, &c. The ill success which attended him here, however, was so far from making him drop the enterprise, that it only made him the more intent on reducing the Grecians; and he resolved to head his army in person, having attributed his former bad success to the inexperience of his generals. But while he was employed in making the necessary preparations for this purpose, he received intelligence that the Egyptians had revolted, so that he was obliged to make preparations for reducing them also; and before this could be done, the king died, after having reigned 36 years, leaving the throne to his son Xerxes.

This prince ascended the throne of Persia in the Expeditions of Xerxes against Egypt and them Greece. year 485 B. C.; and his first enterprise was to reduce

Perſia. them into a worſe ſtate of ſlavery than they ever had experienced before. After this he reſolved on an expedition into Greece; the unfortunate event of which is related under the article *ATTICA*. By his miſfortunes in the Grecian expedition, he became at laſt ſo diſpirited, that he thenceforth abandoned all thoughts of war and conqueſts; but growing tyrannical, and oppreſſing his ſubjects, he was murdered in his bed, in the year 464 B. C. and 21ſt of his reign; and was ſucceeded by his third ſon Artaxerxes, ſurnamed *Longimanus* on account of the great length of his arms.

26
Xerxes ſucceeded by Artaxerxes Longimanus.

This prince is named *Ahaſuerus* in Scripture, and is the ſame who married *Eſther*, and during the whole of his reign ſhowed the greateſt kindneſs to the Jewish nation. In the beginning of his reign he was oppoſed by *Hyſtaſpes* the ſecond ſon of Xerxes, whom, however, he overcame, though not without conſiderable difficulty. After this he applied himſelf to the ſettlement of the affairs of government, and reforming many abuſes which had crept in; and then, being fully eſtabliſhed on the throne, he appointed feaſts and rejoicings to be made for 180 days in the city of *Suſa*; at one of which he reſolved to divorce his queen for diſobedience; and afterwards married *Eſther*, as we find it recorded in the ſacred writings.

In the fifth year of the reign of Artaxerxes the Egyptians revolted anew, and, being aſſiſted by the Athenians, held out for ſix years; but were again obliged to ſubmit, and continued in ſubjection during the whole of his reign. Nothing elſe remarkable happened during the life of Artaxerxes Longimanus, who died in the 41ſt year of his reign; and was ſucceeded by Xerxes II. the only ſon he had by his queen, though by his concubines he had 17. Xerxes having drunk immoderately at an entertainment immediately after his acceſſion, retired to a chamber in order to reſreſh himſelf with ſleep; but here he was murdered by *Sogdianus*, the ſon of Artaxerxes by one of his concubines, after he had reigned 45 days.

27
Xerxes II.

28
Sogdianus.

29
Ochus.

Sogdianus was ſcarce ſeated on the throne when he put to death *Bagorazus*, the moſt faithful of all his father's eunuchs; by which, and the murder of his ſovereign, he became generally odious. Upon this, ſenſible of the dangerous ſituation in which he was, he ſent for one of his brothers named *Ochus*, whom he ſuſpected, with a deſign to murder him the moment he arrived. *Ochus*, however, underſtanding his deſign, put off, by ſeveral pretences, his coming, till he had drawn together a powerful army, with which he advanced to the confines of *Perſia*. Here he openly declared, that his deſign was to revenge his brother's death; which brought over to him many of the nobility and governors of provinces, by whom he was immediately proclaimed king. *Sogdianus*, ſeeing himſelf thus deſerted, contrary to the advice of all his friends, came to an accommodation with *Ochus*; who no ſooner had him in his power than he cauſed him to be ſuffocated among aſhes; a puniſhment invented on purpoſe for him.

Ochus being firmly ſettled on the throne by the death of *Sogdianus*, changed his name to *Darius*; and is by hiſtorians commonly called *Darius Nothus*, or *The Baſtard*. But *Ariſtes*, another of the brothers, ſeeing in what manner *Sogdianus* had got the better

of Xerxes, and been afterwards driven out by *Ochus*, began to entertain thoughts of treating him in the ſame manner. He was not, however, ſo ſucceſsful; for, being defeated in an engagement, he ſurrendered himſelf in hopes of mercy, but was immediately put to death by ſuffocation in aſhes. Several other perſons were executed: but theſe ſeverities did not procure him the repoſe which he expected; for his whole reign was diſturbed with violent commotions in various parts of the empire. One of the moſt dangerous was raiſed by *Piſuthna* governor of *Lydia*; but he being deſerted by his Greek mercenaries, was at laſt overcome, and put to death: however, his ſon *Amorgas* continued to infeſt the maritime provinces of *Aſia Minor* for two years; till he alſo was taken priſoner by *Tiſſaphernes*, the new governor of *Lydia*, who put him to death. Other inſurrections quickly followed this: but the greateſt miſfortune which beſet *Darius* during the whole courſe of his reign was the revolt of the Egyptians, who could not be reduced. Before his death he inveſted *Cyrus* his youngeſt ſon with the ſupreme government of all the provinces of *Aſia Minor*. This was done through the perſuaſions of his mother *Paryſatis*, who had an abſolute ſway over her huſband; and ſhe procured this command for him, that he might thereby be enabled to contend for the kingdom after his father's death. She even inſiſted that the king ſhould declare him heir to the crown before he died; but this he could not by any means be induced to do. He died in the year 405 B. C. and was ſucceeded by his ſon Artaxerxes, by the Greeks ſurnamed *Mnemon* on account of his extraordinary memory.

Perſia.

The moſt remarkable tranſaction which happened during the reign of this prince was the revolt of his brother *Cyrus*. This young prince had been raiſed to ſo great power through the intereſt of his mother, on purpoſe that he might revolt, as we have already ſeen. He began with gaining over the cities under the government of *Tiſſaphernes*; which quickly produced a war with that governor. *Cyrus* then began to aſſemble troops, which he pretended were deſigned only againſt *Tiſſaphernes*. As he had given great aſſiſtance to the *Lacedemonians* in their wars againſt the Athenians, he now in return demanded aſſiſtance from them; which requeſt they very readily complied with, ordering their fleet immediately to join him, and to obey in every thing the commands of *Tamos* his admiral. At laſt *Cyrus*, having collected an army of 13,000 Greek mercenaries and 100,000 regular troops of other nations, ſet out from *Sardis*, directing his march towards Upper *Aſia*; the army being entirely ignorant of the expedition on which they were going. When they arrived at *Tarſus*, the Greeks, ſuſpecting that they were marching againſt the king, reſuſed to proceed any further; but *Cyrus* having gained them over with preſents and promiſes, they ſoon went on with ſatisfaction. Having arrived at *Cunaxa* in the province of *Babylon*, *Cyrus* found his brother with 900,000 men ready to engage him. Whereupon, leaping out of his chariot, he commanded his troops to ſtand to their arms and fall into their ranks; which was done with great expedition, no time being allowed the ſoldiers to reſreſh themſelves. *Clearchus*, the commander of the *Peloponneſian* troops, adviſed *Cyrus* not to charge in perſon, but to remain in

30
Artaxerxes Mnemon.

31
Revolt of Cyrus the Younger.

32
Battle of Cunaxa.

Persia.

the rear of the Greek battalions; but this advice he rejected with indignation, saying, that he should thus render himself unworthy of the crown for which he was fighting. As the king's army drew near, the Greeks fell upon them with such fury, that they routed the wing opposite to them almost at the first onset; upon which Cyrus was with loud shouts proclaimed king by those who stood next to him. But he, in the mean time, perceiving that Artaxerxes was wheeling about to attack him in flank, advanced against him with 600 chosen horse, killed Artageses captain of the king's guards with his own hand, and put the whole body to flight. In this encounter, discovering his brother, he spurred on his horse, and, coming up to him, engaged him with great fury; which in some degree turned the battle into a single combat. Cyrus killed his brother's horse, and wounded him on the ground; but he immediately mounted another horse, when Cyrus attacked him again, gave him a second wound, and had already lifted up his hand to give him a third, when the guards, perceiving the danger in which their king was, discharged their arrows at once against his antagonist, who at the same time throwing himself headlong upon his brother, was pierced through by his javelin. He fell dead upon the spot; and all the chief lords of his court, resolving not to survive him, were slain in the same place.

In the mean time, the Greeks having defeated the enemy's left wing commanded by Tissaphernes, and the king's right wing having put to flight Cyrus's left, both parties, being ignorant of what had passed elsewhere, imagined that they had gained the victory. But Tissaphernes acquainting the king that his men had been put to flight by the Greeks, he immediately rallied his troops, in order to attack them. The Greeks, under the command of Clearchus, easily repulsed them, and pursued them to the foot of the neighbouring hills. As night was drawing near, they halted at the foot of the hill, much surprised that neither Cyrus himself, nor any messenger from him, had appeared; for as yet they knew nothing of his death and the defeat of the rest of the army. They determined therefore to return to their camp, which they did accordingly; but found there that the greatest part of their baggage had been plundered, and all their provisions taken, which obliged them to pass the night in the camp without any sort of refreshment. The next morning, as they were still expecting to hear from Cyrus, they received the news of his death, and the defeat of that part of the army. Whereupon they sent deputies to Ariæus, who was commander in chief of all the other forces of Cyrus, offering him, as conquerors, the crown of Persia. Ariæus rejected the offer, and acquainting them that he intended to set out early in the morning on his return to Ionia, advised them to join him in the night. They followed his directions, and, under the conduct of Clearchus, began their march, arriving at his camp about midnight, whence they set out on their return to Greece. They were at a vast distance from their own country, in the very heart of the Persian empire, surrounded by a victorious and numerous army, and had no way to return again but by forcing their way through an immense track of the enemy's country. But their valour and resolution mastered all these difficulties; and, in spite of a

33
Retreat
of ten
thousand
Greeks.

powerful army, which pursued and harassed them all the way, they made good their retreat for 2325 miles through the provinces belonging to the enemy, and got safe to the Greek cities on the Euxine-sea. This retreat (the longest that was ever made through an enemy's country) was conducted at first by Clearchus; but he being cut off through the treachery of Tissaphernes, Xenophon was chosen in his room, who at last brought his men safe into Greece: but for a full account of that famous retreat, see the article XENOPHON.

The war with Cyrus was scarce ended, when another broke out with the Lacedemonians, on the following account. Tissaphernes being appointed to succeed Cyrus in all his power, to which was added all which he himself possessed formerly, began to oppress the Greek cities in Asia in a most cruel manner. On this they sent ambassadors to Sparta, desiring the assistance of that powerful republic. The Spartans having ended their long war with the Athenians, willingly laid hold of the present opportunity of breaking again with the Persians, and therefore sent against them an army under the command of Thimbro, who, being strengthened by the forces which returned under Xenophon, took the field against Tissaphernes. But Thimbro being soon recalled upon some complaints, Dercyllidas, a brave officer and experienced engineer, was appointed to succeed him; and he carried on the war to much more advantage than his predecessor. On his arrival in Asia, finding that Tissaphernes was at variance with another governor named Pharnabazus, he concluded a truce with the former, and marching against Pharnabazus, drove him quite out of Æolis, and took several cities in other parts. The latter, however, immediately repaired to the Persian court, where he made loud complaints against Tissaphernes, but gave the king a most salutary advice, which was to equip a powerful fleet, and give the command of it to Conon the Athenian, the best sea-officer of his time, by which means he would obstruct the passage of further recruits from Greece; and thus soon put an end to the power of the Lacedemonians in Asia. This advice being approved of, the king ordered 500 talents for the equipment of a fleet, with directions to give Conon the command of it.

In the mean time, Dercyllidas, with all his valour and skill, suffered himself to be drawn into such a disadvantageous situation, that he must inevitably have been destroyed with his whole army, had it not been through the cowardice of Tissaphernes, who having experienced the Grecian valour at the battle of Cunaxa, could not by any means be induced to attack them. The Lacedemonians, however, having heard that the Persian monarch was fitting out a great fleet against them, resolved to push on the war as vigorously as possible; and for this purpose sent over Agesilaus one of their kings, and a most experienced commander, into Asia. This expedition was carried on with such secrecy, that Agesilaus arrived at Ephesus before the Persians had the least notice of his designs. Here he took the field with 10,000 foot and 4000 horse, and falling upon the enemy while they were totally unprepared, carried every thing before him. Tissaphernes deceived him into a truce till he had leisure to assemble his forces, but gained little by his treachery;

Persia.

34
War with
the Lacede-
monians.

Perſia. *erv;* for Ageſilaus deceived him in his turn, and while Tiſſaphernes marched his troops into Caria, the Greeks invaded and plundered Phrygia.

Early in the ſpring, Ageſilaus gave out that his deſign was to invade Lydia; but Tiſſaphernes, who remembered the laſt year's ſtratagem, now taking it for granted that Ageſilaus would really invade Caria, made his troops again march to the defence of that province. But Ageſilaus now led his army into Lydia as he had given out, and approached Sardis; upon which Tiſſaphernes recalled his forces from their former rout, with a deſign to relieve the place. But Caria being a very mountainous country, and unfit for horſe, he had marched thither only with the foot, and left the horſe behind on the borders of that province. Whence, on their marching back to the relief of Sardis, the horſe being ſome days march before the foot, Ageſilaus took the advantage of ſo favourable an opportunity, and fell upon them before the foot could come to their aſſiſtance. The Perſians were routed at the very firſt onſet; after which Ageſilaus over-ran the whole country, enriching both himſelf and his army with the ſpoils of the conquered Perſians.

By this continued ill fortune Artaxerxes was ſo much provoked againſt Tiſſaphernes, that he ſoon after cauſed him to be put to death.

On the death of Tiſſaphernes, Tithrauſtes, who was appointed to ſucceed him, ſent large preſents to Ageſilaus, in hopes of perſuading him to abandon his conqueſts; but finding that commander was not by any means to be induced to relinquish the war, he ſent Timocrates of Rhodes into Greece, with large ſums of money to corrupt the leading men in the cities, and rekindle a war againſt the Lacedemonians. This ſtratagem produced the intended effect; for the cities of Thebes, Argos, Corinth, and others, entering into a confederacy, obliged them to recal Ageſilaus to the defence of his own country.

35
Ageſilaus
obliged to
leave Aſia.

36
Lacedemo-
nians de-
ſcated.

After the departure of Ageſilaus, which happened in the year 354 B. C. the Lacedemonian power received a ſevere blow at Cnidus, where their fleet was entirely defeated by that of Artaxerxes under Conon, 50 of their ſhips being taken in the engagement; after which, Conon and Pharnabazus being maſters of the ſea, ſailed round the iſlands and coaſts of Aſia, taking the cities there which had been reduced by the Lacedemonians. Seſtos and Abydos only held out, and reſiſted the utmoſt efforts of the enemy, though they had been beſieged both by ſea and land.

Next year Conon having aſſembled a powerful fleet, again took Pharnabazus on board, and reduced the iſland of Melos, from whence he made a deſcent on the coaſts of Lyconia, pillaging all the maritime provinces, and loading his fleet with an immense booty. After this, Conon obtained leave of him to repair to Athens with 80 ſhips and 50 talents, in order to rebuild the walls of that city; having firſt convinced Pharnabazus, that nothing could more effectually contribute to the weakening of the power of Sparta than putting Athens again in a condition to rival its power. He no ſooner arrived at Piræus the port of Athens, but he began to work; which, as he had a great number of hands, and was ſeconded by the zeal of all thoſe that were well inclined to the Athenians, was ſoon completed, and the city not only reſtored to

its former ſplendor, but rendered more formidable than ever. The Lacedemonians were now reduced to the neceſſity of accepting ſuch terms of peace as they could procure. The terms were, that all the Greek cities in Aſia ſhould be ſubject to the king of Perſia, as alſo the iſlands of Cyprus and Clazomena; that the iſlands of Scyros, Lemnos, and Imbros, ſhould be reſtored to the Athenians, and all the cities of Greece, whether ſmall or great, ſhould be declared free; and by the ſame treaty, Artaxerxes engaged to join thoſe who accepted the terms he propoſed, and to aſſiſt them to the utmoſt of his power againſt ſuch as ſhould reject them.

Perſia.
37
Are obliged
to make
peace with
the Per-
ſians.

Artaxerxes, being now diſengaged from the Gre-
cian war, turned his arms againſt Evagoras king of Cyprus. This man was deſcended from the ancient kings of Salamine, the capital city of the iſland of Cyprus. His anceſtors had held that city for many ages in quality of ſovereigns; but were at laſt driven out by the Perſians, who, making themſelves maſters of the whole iſland, reduced it to a Perſian province. Evagoras, however, being a man of an enterpriſing genius, ſoon became weary of living in ſubjection to a foreign power, drove out the Perſian governor, and recovered his paternal kingdom. Artaxerxes attempted to drive him out of it; but, being diverted by the Greek war, was obliged to put off the enterprize. However, Conon, by means of Cteſias chief phyſician to Artaxerxes, got all differences accommodated, and Artaxerxes promiſed not to moleſt him in the poſſeſſion of his ſmall kingdom. But Evagoras ſoon becoming diſcontented with ſuch a narrow poſſeſſion, gradually reduced under his ſubjection almoſt the whole of the iſland. Some, however, there were, who held out againſt him, and theſe immediately applied to Artaxerxes for aſſiſtance; and he, as ſoon as the war with Greece was at an end, bent all his force againſt Evagoras, intending to drive him quite out of the iſland. The Athenians, however, notwithſtanding the favours lately conferred upon them by the king of Perſia, could not forbear aſſiſting their old ally in ſuch a dreadful emergency. Accordingly, they ſent him ten men of war under the command of Philocrates; but the Lacedemonian fleet, commanded by Talentias brother to Ageſilaus, falling in with them near the iſle of Rhodes, ſurrounded them ſo that not one ſhip could eſcape. The Athenians, determined to aſſiſt Evagoras at all events, ſent Chabrias with another fleet and a conſiderable body of land forces; and with the aſſiſtance of theſe he quickly reduced the whole iſland. But in a ſhort time, the Athenians being obliged, in conſequence of the treaty concluded with the Perſians, to recal Chabrias, Artaxerxes attacked the iſland with an army of 300,000 men, and a fleet of 300 ſhips. Evagoras applied to the Egyptians, Libyans, Arabians, Tyrians, and other nations, from whom he received ſupplies both of men and money; and fitted out a fleet, with which he ventured an engagement with that of Artaxerxes. But being defeated, and obliged to ſhut himſelf up in Salamine, he was cloſely beſieged by ſea and land. Here at laſt he was obliged to capitulate, and abandon to the Perſians the whole of the iſland except Salamine, which he held as a king tributary to Artaxerxes.

38
Cyprus re-
duced.

The Cyprian war being ended, Artaxerxes turned
his

Perſia.
39
Unſucceſs-
ful expe-
ditions
againſt the
Caduſians
and Eryp-
tians.

his arms againſt the Caduſians, whoſe country lay be-
tween the Euxine and Caſpian ſeas. But theſe na-
tions were too well accuſtomed to war to be overcome
by the Perſians; and therefore the king was obliged to
abandon the project, after having loſt a great number
of his troops and all the horſes which he took out with
him. In his Egyptian expedition, which happened
immediately after the Caduſian war, he was attended
with little better ſucceſs; which, however, was owing
to the bad conduct of his general Pharnabazus. This
commander being entruſted with the management of
the Egyptian war, ſent an ambaffador to Athens, com-
plaining that Chabrias had engaged in the ſervice of
an enemy of the king of Perſia, with whom the ſtate
of Athens was in alliance, and threatening the repub-
lic with his maſter's reſentment if proper ſatiſfaction
was not given: at the ſame time he demanded Iphi-
crates, another Athenian, and the beſt general of his
time, to command the Greek mercenaries in the Per-
ſian ſervice. This the Athenians complied with; and
Iphicrates having muſtered his troops, ſo exerciſed
them in all the arts of war, that they became after-
wards very famous among the Greeks under the name
of *Iphicrateſian ſoldiers*. Indeed he had ſufficient time
to inſtruct them; for the Perſians were ſo ſlow in their
preparations, that two whole years elapſed before they
were ready to take the field. At the ſame time Ar-
taxerxes, that he might draw the more mercenaries
out of Greece, ſent ambaffadors to the different ſtates
in it, declaring it to be his will and pleaſure that they
ſhould live at peace with each other, on the terms of
the treaty lately concluded: which declaration was re-
ceived with pleaſure by all the ſtates except Thebes,
who aſpired at the ſovereignty of Greece; and accord-
ingly reſuſed to conform to it. All things, however,
at laſt being ready for the expedition, the troops were
muſtered at the city then called *Ace*, and ſince *Ptole-
mais*; where they were found to conſiſt of 200,000
Perſians under the command of Pharnabazus, and
20,000 Greeks led by Iphicrates. The fleet conſiſted
of 300 galleys, beſides a vaſt number of other veſſels
which followed with provisions. The fleet and army
began to move at the ſame time; and that they might
act in concert, they ſeparated as little as poſſible. It
was propoſed, that the war ſhould begin with the ſiege
of Peluſium; but Neſtanebus, the revolted king of
Egypt, had provided ſo well for the defence of the
place, that it was thought expedient to drop the en-
terprize, and make a deſcent at one of the mouths of
the Nile. In this they ſucceeded: for the Egyptians
not expecting them at that place, had not taken ſuch
care to fortify it as at Peluſium. The fortrefs of
conſequence was eaſily taken, and all the Egyptians
in it put to the ſword. After this, Iphicrates was for
embarking the troops without loſs of time, and at-
tacking Memphis the capital of Egypt. Had this opi-
nion been followed before the Egyptians recovered
from the conſternation into which they were thrown,
it is highly probable that the whole country might
have been reduced at once: but Pharnabazus would
undertake nothing before the reſt of the forces were
come up. Iphicrates then, in the utmoſt vexation at
loſing ſo favourable an opportunity, preſſed Pharnaba-
zus to allow him to attack the place with the Greek

mercenaries only; but he reſuſed this alſo, from a
mean jealousy of the honour which Iphicrates might
acquire; and in the mean time the Egyptians recovered
ſufficient courage to put themſelves in ſuch a poſture of
defence, that they could not be attacked with any pro-
bability of ſucceſs; and at the ſame time the Nile over-
flowing as uſual, obliged them to return to Phœnice.
The expedition was again undertaken 12 years after,
but without ſucceſs.

The laſt years of the reign of Artaxerxes were great-
ly diſturbed by diſſenſions in his family; which at laſt
broke his heart, and he died in the 94th year of his
age, and 46th of his reign. He was ſucceeded by one
of his ſons named *Ochus*, who behaved with ſuch cruel-
ty, that almoſt one half of his dominions revolted as
ſoon as he came to the throne. But, by reaſon of the
diſſenſions of the rebels among themſelves, all of them
were reduced, one after another; and among the reſt,
the Sidonians, finding themſelves betrayed, burnt them-
ſelves to the number of 40,000, together with their
wives and children.

Ochus, having quelled all the infurgents, imme-
diately ſet himſelf about reducing Egypt, and for this
purpose procured a reinforcement of other 10,000
mercenaries from Greece. On his march, he loſt a
great number of his men drowned in the lake Serbonis,
which lies between Phœnice and Egypt, extending
about 30 miles in length. When the ſouth wind
blows, the whole ſurface of this lake is covered with
ſand, in ſuch a manner that no one can diſtinguiſh it
from the firm land. Several parties of Ochus's army
were loſt in it for want of proper guides; and it is ſaid
that whole armies have ſometimes periſhed in the ſame
place. When he arrived in Egypt, he detached three
bodies to invade the country in different parts; each
being commanded by a Perſian and a Greek general.
The firſt was led by Lachares the Theban, and Ro-
ſaces governor of Lydia and Ionia; the ſecond by
Nicoſtratus the Theban and Ariſtazanes; the third
by Mentor the Rhodian and Bagoas an eunuch. The
main body of the army he kept with himſelf, and en-
camped near Peluſium, with a deſign to watch the
events of the war there. The event was ſucceſſful, as
we have related under the article EGYPT; and Ochus
having reduced the whole country, diſmantled their
ſtrongholds, plundered the temples, and returned to
Babylon loaded with booty.

The king, having ended this war with ſuch ſucceſs,
conferred very high rewards on his mercenaries and
others who had diſtinguiſhed themſelves. To Mentor
the Rhodian he gave 100 talents, and other preſents
to a great value; appointing him alſo governor of all
the coaſts of Aſia, and committing to his care the
whole management of the war which he was ſtill carry-
ing on againſt ſome provinces that had revolted in the
beginning of his reign; and all theſe either by ſtrata-
gems, or by force, he at laſt reduced; reſtoring the
king's authority in all theſe places.—Ochus then, find-
ing himſelf free from all troubles, gave his attention to
nothing but his pleaſures, leaving the adminiſtration
of affairs entirely to Bagoas the eunuch, and to Men-
tor. Theſe two agreed to ſhare the power between
them; in conſequence of which the former had the pro-
vinces of Upper Aſia, and the latter all the reſt. Ba-
goas,

40
Ochus ſuc-
ceeds Ar-
taxerxes.

41
Reduces
Egypt.

⁴² *Perfia.* Bagoas, being by birth an Egyptian, had a great zeal for the religion of his country, and endeavoured, on the conquest of Egypt, to influence the king in favour of the Egyptian ceremonies; but, in spite of all his endeavours, Ochus not only refused to comply, but killed the sacred bull, the emblem of the Egyptian god Apis, plundered the temples, and carried away their sacred records. This Bagoas supposed to be the highest guilt which a human creature could commit; and therefore poisoned his master and benefactor in the 21st year of his reign. Nor did his revenge stop here; for he kept the king's body, causing another to be buried in its stead; and because the king had caused his attendants eat the flesh of Apis, Bagoas cut his body in pieces, and gave it so mangled to be devoured by cats, making handles for swords of his bones. He then placed Arses the youngest of the deceased king's sons on the throne, that he might the more easily preserve the whole power to himself.

⁴³ *Ochus murdered by Bagoas.* Arses did not long enjoy even the shadow of power which Bagoas allowed him, being murdered in the second year of his reign by that treacherous eunuch, who now conferred the crown on Darius Codomannus, a distant relation of the royal family. Neither did he incline to let him enjoy the crown much longer than his predecessor; for, finding that he would not suffer himself to be guided by him in all things, the treacherous Bagoas brought him a poisonous potion; but Darius got rid of him by his own artifice, causing him to drink the poison which he brought. This established Darius in the throne as far as security from internal enemies could do so; but in a very little time his dominions were invaded, and, we may say, the same moment conquered, by Alexander the Great. The particulars of that hero's conquest are related under the article MACEDON; we shall therefore here only take notice of the fate of Darius himself, with which the Persian empire concluded for many ages. After the battle of Arbela, which was decisive in favour of Alexander, the latter took and plundered Persopolis, from whence he marched into Media, in order to pursue Darius, who had fled to Ecbatan the capital of that province. This unhappy prince had still an army of 30,000 foot, among whom were 4000 Greeks, who continued faithful to the last. Besides these, he had 4000 slingers and 3000 horse, most of them Bactrians, and commanded by Bessus governor of Bactria. When Darius heard that Alexander was marched to Ecbatan, he retired into Bactria, with a design to raise another army; but soon after, changing his mind, he determined to venture a battle with the forces he still had left. On this Bessus governor of Bactria, and Nabarzanes a Persian lord of great distinction, formed a conspiracy against him, proposing to seize his person, and, if Alexander pursued them, to gain his friendship and protection by betraying their master into his hands; but if they escaped, their design was to murder him, and usurp the crown. The troops were easily gained over, by representing to them the desperate situation of Darius's affairs; but Darius himself, though informed of their proceedings, and solicited to trust his person among the Greeks, refused to give credit to the report, or follow such a salutary counsel. The consequence of this was, that he was in a few days seized by the traitors; who, out

of respect to the royal dignity, bound him with golden chains, and shutting him up in a covered cart, fled with him towards Bactria. The cart was covered with skins, and strangers appointed to drive it without knowing who the prisoner was. Bessus was proclaimed commander in chief in the room of Darius by the Bactrian horse; but Artabazus and his sons, with the forces they commanded, and the Greeks, under the command of one *Patron*, retired from the body of the army under Bessus, and marched over the mountains towards Parthiene. In the mean time Alexander arriving at Ecbatan, was informed that Darius had left the place five days before. He then dispatched orders to Clitus, who had fallen sick at Susa, to repair, as soon as he recovered, to Ecbatan, and from thence to follow him into Parthia with the cavalry and 6000 Macedonians, who were left in Ecbatan. Alexander himself with the rest of the army pursued Darius; and the 11th day arrived at *Rhages*, having marched in that space of time 3300 furlongs. Most of those who accompanied him died through the fatigue of so long a march; insomuch that, on his arrival at Rhages, he could scarce muster 60 horsemen. Finding that he could not come up with Darius, who had already passed the Caspian straits, he staid five days at Rhages, in order to refresh his army and settle the affairs of Media. From thence he marched into Parthia, and encamped at a small distance from the Caspian straits, which he passed the next day without opposition. He had scarce entered Parthia, when he was informed that Bessus and Nabarzanes had conspired against Darius, and designed to seize him. Hereupon, leaving the main body of the army behind with Craterus, he advanced with a small troop of horse lightly armed; and having marched day and night without ever halting, except for a few hours, he came on the third day to a village where Bessus with his Bactrians had encamped the day before. Here he understood that Darius had been seized by the traitors; that Bessus had caused him to be shut up in a close cart, which he had sent before, that he might be the more sure of his person; and that the whole army except Artabazus and the Greeks, who had taken another rout, obeyed Bessus. Alexander therefore taking with him a small body of light-armed horse, for the others could not possibly proceed further, at last came in sight of the barbarians, who were marching in great confusion. His unexpected appearance struck them, though far superior in number, with such terror, that they immediately betook themselves to flight; and because Darius refused to follow them, Bessus and those who were about him discharged their darts at the unfortunate prince, leaving him wallowing in his blood. After this they all fled different ways, and were pursued with great slaughter by the Macedonians. In the mean time the horses that drew the cart in which Darius was, stopped of their own accord, for the drivers had been killed by Bessus, near a village about four furlongs from the highway. Thither Polystratus a Macedonian, being pressed with thirst in the pursuit of the enemy, was directed by the inhabitants to a fountain to refresh himself, not far from the place where they stopped. As he was filling his helmet with water, he heard the groans of a dying man; and looking round him, discovered a cart with a team of horses, unable to move.

*Perfia.*⁴⁶ And murdered.⁴⁵ Darius seized by his own subjects.

Persia.

move by reason of the many wounds they had received. When he drew near, he perceived Darius lying in the cart, and very near his end, having several darts sticking in his body. However, he had strength enough left to call for some water, which Polystratus readily brought him. Darius, after drinking, turned to the Macedonian, and with a faint voice told him, that, in the deplorable state to which he was reduced, it was no small comfort to him that his last words would not be lost: he then charged him to return his hearty thanks to Alexander for the kindness he had shown to his wife and family, and to acquaint him, that, with his last breath, he besought the gods to prosper him in all his undertakings, and make him sole monarch of the universe. He added, that it did not so much concern him as Alexander to pursue and bring to condign punishment those traitors who had treated their lawful sovereign with such cruelty, that being the common cause of all crowned heads. Then, taking Polystratus by the hand, "Give Alexander your hand, says he, as I give you mine, and carry him, in my name, the only pledge I am able to give, in this condition, of my gratitude and affection." Having uttered these words, he expired in the arms of Polystratus. Alexander coming up a few minutes after, bewailed his death, and caused his body to be interred with the highest honours. The traitor Bessus being at last reduced to extreme difficulties, was delivered up by his own men naked and bound into the hands of the Macedonians; on which Alexander gave him up to Oxathres the brother of Darius, to suffer what punishment he should think proper. Plutarch tells us that he was executed in the following manner: Several trees being by main force bent down to the ground, and one of the traitor's limbs tied to each of them, the trees, as they were suffered to return to their natural position, flew back with such violence, that each carried with it the limb that was tied to it.

47
His murderers pursued.

48
Revolt of the Parthians.

49
Persian empire again restored by Artaxares.

Thus ended the empire of Persia, 209 years after it had been founded by Cyrus. After the death of Alexander the Persian dominions became subject to Seleucus Nicator, and continued subject to him for 62 years, when the Parthians revolted, and conquered the greatest part of them. To the Parthians they continued subject for 475 years; when the sovereignty was again restored to the Persians, as related under the article PARTHIA.

The restorer of the Persian monarchy was Artaxerxes, or Artaxares, who was not only a private person, but of spurious birth. However, he possessed great abilities, by which means he executed his ambitious projects. He was no sooner seated on the throne than he took the pompous title of *king of kings*, and formed a design of restoring the empire to its ancient glory. He therefore gave notice to the Roman governors of the provinces bordering on his dominions, that he had a just right, as the successor of Cyrus, to all the Lesser Asia; which he therefore commanded them immediately to quit, as well as the provinces on the frontiers of the ancient Parthian kingdom, which were already his. The consequence of this was a war with Alexander Severus the Roman emperor. Concerning the event of this war there are very different accounts. It is certain, however, that, on account of his exploits against Artaxares, Alexander took the titles of *Par-*

thicus and *Perseus*; though, it would seem, with no great reason, as the Persian monarch lost none of his dominions, and his successors were equally ready with himself to invade the Roman territories.

Artaxares dying after a reign of 12 or 15 years, was succeeded by his son Sapor; a prince of great abilities both of body and mind, but fierce, haughty, untractable, and cruel. He was no sooner seated on the throne than he began a new war with the Romans. In the beginning he was unsuccessful: being obliged by the young emperor Gordian, to withdraw from the Roman dominions, and was even invaded in his turn; but, in a short time, Gordian being murdered by Philip, the new emperor made peace with him upon terms very advantageous to the Persians. He was no sooner gone than Sapor renewed his incursions, and made such alarming progress, that the emperor Valerian, at the age of 70, marched against him in person with a numerous army. An engagement ensued, in which the Romans were defeated, and Valerian taken prisoner. Sapor pursued his advantages with such insolence of cruelty, that the people of the provinces took arms, first under Callistus a Roman general, and then under Odenatus prince of Palmyrene. Thus they not only protected themselves from the insults of the Persians, but even gained many great victories over them, and drove Sapor with disgrace into his own dominions. In his march he is said to have made use of the bodies of his unfortunate prisoners to fill up the hollow roads, and to facilitate the passage of his carriages over such rivers as lay in his way. On his return to Persia, he was solicited by the kings of the Cadusians, Armenians, Bactrians, and other nations, to set Valerian at liberty; but to no purpose. On the contrary, he used him the worse; treated him daily with indignities, set his foot upon his neck when he mounted his horse, and, as is affirmed by some, flayed him alive after some years confinement; and caused his skin to be tanned, which he kept as a monument of his victory over the Romans. This extreme insolence and cruelty was followed by an uninterrupted course of misfortune. Odenatus defeated him in every engagement, and even seemed ready to overthrow his empire; and after him Aurelian took ample vengeance for the captivity of Valerian. Sapor died in the year of Christ 273, after having reigned 31 years; and was succeeded by his son Hormisdas, and he by Varanes I. Concerning both these princes we know nothing more than that the former reigned a year and ten days, and the latter three years; after which he left the crown to Varanes II. who seems to have been so much awed by the power of the Romans, that he durst undertake nothing. The rest of the Persian history, to the overthrow of the empire by the Saracens, affords nothing but an account of their continued invasions of the Roman empire, which more properly belongs to the history of Rome: and to which therefore we refer. The last of the Persian monarchs, of the line of Artaxares, was Isdigertes, or Jezdegerd, as he is called by the Arabian and Persian historians, who was cotemporary with Omar the second caliph after Mahomet. He was scarce seated on the throne, when he found himself attacked by a powerful army of Saracens under the command of one Sad, who invaded the country through Chaldea. The Persian general took all imaginable pains to harass the Arabs on their march;

50

Succeeded by Sapor, who takes Valerian prisoner.

51

And treats him cruelly.

52

The Persian empire overthrown by the Saracens.

Persia. march; and having an army superior to them in numbers, employed them continually in skirmishes; which were sometimes favourable to him and sometimes otherwise. But Sad, perceiving that this lingering war would destroy his army, determined to hasten forward, and force the enemy to a general engagement. The Persians declined this for a long time; but at length, finding a convenient plain where all their forces might act, they drew up in order of battle, and resolved to wait for the Arabs. Sad having disposed his men in the best order he could, attacked the Persians with the utmost fury. The battle lasted three days and three nights; the Persians retiring continually from one post to another, till at last they were entirely defeated; and thus the capital city, and the greatest part of the dominions of Persia, fell into the hands of the Arabs. The conquerors seized the treasures of the king; which were so vast, that, according to a Mahometan tradition, their prophet gave the Saracen army a miraculous view of those treasures before the engagement, in order to encourage them to fight.

After the loss of this battle, Jezdegerd retired into Chorassan, where he maintained himself as king, having under his subjection two other provinces, named *Kerman* and *Segestan*. But after he had reigned in this limited manner for 19 years, one of the governors of the few towns he had left betrayed it, and called in the Turks. This place was called *Merou*, seated on the river Gihon or Odus. Jezdegerd immediately marched against the rebels and their allies. The Persians were defeated; and the unfortunate monarch, having with much difficulty reached the river, found there a little boat, and a fisherman to whom it belonged. The king offered him a bracelet of precious stones; but the fellow, equally brutal and stupid, told him that his fare was five farthings, and that he would neither take more nor less. While they disputed, a party of the rebel horse came up, and knowing Jezdegerd, killed him in the year 652.

Jezdegerd left behind him a son named *Firouz*, and a daughter named *Dara*. The latter espoused Bostanay, whom the rabbinical writers have dignified with the title of the *head of the captivity*; and who, in fact, was the prince of the Jews settled in Chaldea. As for Firouz, he still preserved a little principality; and when he died, left a daughter named *Mah Afrid*, who married Walid the son of the caliph Abdalmalek, by whom she had a son named *Yezid*, who became caliph, and consequently sovereign of Persia; and so far was this prince from thinking himself above claiming the title derived from his mother, that he constantly styled himself *the son of Khosrou king of Persia, the descendant of the caliph Marwan, and among whose ancestors on the side of the mother were the Roman emperor and the khacan*.

53
State of
Persia under the
Mogul
princes.

Persia continued to be subject to the Arabs till the decline of the Saracen empire, when it was seized by various usurpers, till the time of Jenghiz Khan, who conquered it as well as almost all the rest of Asia. After his death, which happened in the year 1227, Persia, together with the neighbouring countries, were governed by officers appointed by his successors, who reigned at Kærakorum, in the eastern parts of Tartary, till the year 1253, when it became once more the seat of a mighty empire under Hulaku the Mogul, who in 1256 abolished the khalifat, by taking the city of BAGDAD, as related under that article. After the death

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of Hulaku, his son Abaka succeeded to his extensive dominions; and his first care was to shut up all the avenues of his empire against the other princes of the race of Jenghiz Khan, who reigned in different parts of Tartary. His precautions, however, were of little avail; for in the very beginning of his reign he was invaded by Barkan Khan, of the race of Jagatay the son of Jenghiz Khan, from Great Bukharia, with an army of 300,000 men. Abaka was but indifferently prepared to oppose such a formidable power; but, happily for him, his antagonist died before the armies came to an engagement, upon which the invaders dispersed and returned to Tartary. In the year 1264, Armenia and Anatolia were ravaged by the Mamlucks from Egypt, but were obliged to fly from Abaka; who thus seemed to be established in the possession of an empire almost as extensive as that of the ancient Persian kings. His tranquillity, however, was of short duration; for in 1268 his dominions were invaded by Borak Khan, a prince likewise of the race of Jagatay, with an army of 100,000 men. He quickly reduced the province of Chorassan, where he met with little opposition, and in 1269 advanced as far as Aderbijan, where Abaka had the bulk of his forces. A bloody battle ensued; in which Abaka was victorious, and Borak obliged to fly into Tartary, with the loss of all his baggage and great part of his army. Abaka died in 1282, after a reign of 17 years, not without suspicion of being poisoned; and was succeeded by his brother Ahmed Khan. He was the first of the family of Jenghiz Khan who embraced Mahometanism; but neither he nor his successors appear to have been in the least versed in the arts of government; for the Persian history, from this period, becomes only an account of insurrections, murders, rebellions, and poisonings, till the year 1335, when it split all to pieces, and was possessed by a great number of petty princes; all of whom were at perpetual war with each other till the time of Timur Beg, or Tamerlane, who once more reduced them all under one jurisdiction.

Persia.

54
Under Tamerlane
and his successors.

After the death of Tamerlane, Persia continued to be governed by his son Shah Rukh, a wise and valiant prince: but immediately after his death fell into the same confusion as before; being held by a great number of petty tyrants, till the beginning of the 16th century, when it was conquered by Shah Ismael Saffi, or Sefi; of whose family we have the following account. His father was Sheykh Hayder or Haydr, the son of Sultan Juneyd, the son of Sheykh Ibrahim, the son of Sheykh Ali, the son of Sheykh Musa, the son of Sheykh Sefi, who was the 13th in a direct line from Ali the son-in-law of the prophet Mahomet. When Tamerlane returned from the defeat of Bajazet the Turkish sultan, he carried with him a great number of captives out of Karamania and Anatolia, all of whom he intended to put to death on some remarkable occasion; and with this resolution he entered Ardebil, or Ardevil, a city of Aderbijan, about 25 miles to the east of Taurus, where he continued for some days. At this time lived in that city the Sheykh Saffi or Sefi above-mentioned, reputed by the inhabitants to be a saint; and, as such, much revered by them. The fame of Saffi's sanctity so much moved Tamerlane, that he paid him frequent visits; and, when he was about to depart, promised to grant whatever favour he should ask. Sheykh Saffi, who had been informed of Tamer-

55
Conquered
by Ismael
Saffi.

Y Tamerlane's

Persia.

lane's design to put the captives to death, requested of the conqueror that he would spare the lives of those unfortunate men. Tamerlane, desirous of obliging him, not only granted this request, but delivered them up to him to be disposed of as he thought fit; upon which the Sheykh furnished them with clothes and other necessaries as well as he could, and sent them home to their respective countries. This generous action proved very beneficial to the family; for the people were so much affected with such an extraordinary instance of virtue, that they repaired in great numbers to Sâfi, bringing with them considerable presents; and this so frequently, that few days passed in which he was not visited by many. Thus the descendants of the Sheykh made a conspicuous figure till the year 1486, when they were all destroyed by the Turkmen except Ismael, who fled to Ghilan, where he lived under the protection of the king of that country; after which he became conspicuous on the following occasion.

There was at that time, among the Mahometans, a vast number of people dispersed over Asia; and among these a particular party who followed that of Haydr the father of Ismael, which Sheykh Sâfi, one of his ancestors, had brought into great reputation. Ismael, who had assumed the surname of *Sofi*, or *Sage*, finding that Persia was all in confusion, and hearing that there was a great number of the Hayderian sect in Karamania, removed thither. There he collected 7000 of his party, all devoted to the interest of his family; and while he was yet only 14 years of age, conquered Shirwan. After this he pursued his conquests; and as his antagonists never united to oppose him, had conquered the greatest part of Persia, and reduced the city of Bagdad by the year 1510. However, his conquests on the west side were soon stopped by the Turks; for, in 1511, he received a great defeat from Selim I. who took Tauris; and would probably have crushed the empire of Ismael in its infancy, had he not thought the conquest of Egypt more important than that of Persia. After his defeat by Selim, Ismael never undertook any thing of consequence. He died in 1523, leaving the crown to his eldest son Thamasp I.

The new shah was a man of very limited abilities, and was therefore invaded by the Turks almost instantly on his accession to the throne. However, they were obliged to retreat by an inundation, which overflowed their camp, and which frightened them with its red colour, probably arising from the nature of the soil over which it passed. Thamasp, however, reduced Georgia to a province of the Persian empire; that country being in his time divided among a number of petty princes, who, by reason of their divisions, were able to make little opposition.

The reigns of the succeeding princes afford nothing remarkable till the time of Shah Abbas I. surnamed the *Great*. He ascended the throne in the year 1584; and his first care was to recover from the Turks and Tartars the large provinces they had seized which formerly belonged to the Persian empire. He began with declaring war against the latter, who had seized the finest part of Chorassan. Accordingly, having raised a powerful army, he entered that province, where he was met by Abdallah Khan the chief of the Usbeck Tartars. The two armies lay in sight of each other

for six months; but at length Abbas attacked and defeated his enemies, forcing them, for that time, to abandon Chorassan. Here he continued for three years; and on his leaving that place, fixed the seat of government at Ispahan, where it has continued ever since. His next expedition was against the Turks. Understanding that the garrison of Tauris was in no expectation of an enemy, he formed a design of surprising the place; and having privately assembled a few forces, he marched with such celerity, that he reached a pass called *Shibli*, very near Tauris, in six days, though it is usually 18 or 20 days journey for the caravans. Here the Turks had posted a few soldiers, rather for the purpose of collecting the customs on such commodities as were brought that way, than of defending the pass against an enemy. Before they came in sight of this pass, Abbas and some of his officers left the rest of the army, and rode briskly up to the turnpike. Here the secretary of the customhouse, taking them for merchants, demanded the usual duties. Abbas replied, that the person who had the purse was behind, but at the same time ordered some money to be given him. But while the secretary was counting it, he was suddenly stabbed by the Shah's order; and the officers who were with him suddenly falling upon the few soldiers who were there, obliged them to submit; after which he entered the pass with his army. The governor of Tauris marched out with all the troops he could collect on so short a warning; but being inferior to the Persians, he was utterly defeated, and himself taken prisoner; after which the city was obliged to submit, as also a number of places in the neighbourhood. One city only, called *Orumi*, being very strongly situated, resisted all the efforts of Abbas; but was at last taken by the assistance of the Curds, whom he gained over by promising to share the plunder of the place with them. But instead of this, he formed a design to cut them all off at once; fearing that they might at another time do the Turks a service of the same nature that they had done to him just now. For this reason he invited their chiefs to dine with him; and having brought them to a tent, the entrance to which had several turnings, he stationed on the inside two executioners, who cut off the heads of the guests as soon as they entered.

After this Shah Abbas considerably enlarged his dominions, and repelled two dangerous invasions of the Turks. He attempted also to promote commerce, and civilize his subjects; but stained all his great actions by his abominable cruelties, which he practised on every one who gave him the least cause of offence; nay, frequently without any cause at all. He took the Isle of Ormus from the Portuguese, who had kept it since 1507, by the assistance of some English ships in 1622; and died six years after, aged 70.

The princes who succeeded Shah Abbas the Great, were remarkable only for their cruelties and debaucheries, which occasioned a revolution in 1716, when the Shah Hussein was dethroned by the Afghans, a people inhabiting the country between Persia and India; who being oppressed by the ministers, revolted under the conduct of one Merewis. The princes of the Afghan race continued to enjoy the sovereignty for no more than 16 years, when Ashraff the reigning shah was dethroned by one of his officers*. On this

Thamasp,

36
Reign of
Shah Ab-
bas the
Great.

57
History
of Khouli-
Khan.
* See Pat-
tans.

Persia. Thamas, otherwise called *Prince Thamas*, the only survivor of the family of Abbas, assembling an army, invited into his service Nadir Khan, who had obtained great reputation for his valour and conduct. He was the son of a Persian nobleman, on the frontiers of Usbeck Tartary; and his uncle, who was his guardian, keeping him out of possession of the castle and estate, which was his inheritance, he took to robbing the caravans; and, having increased his followers to upwards of 5000 men, became the terror of that part of the country, and especially of his uncle, who had seized his estate. His uncle therefore resolved to make his peace with him, and with that view invited him to the castle, where he entertained him in a splendid manner; but Nadir Khan ordered his throat to be cut next night, and all his people to be turned out of the castle. No sooner had Nadir Khan got the command of the Persian army, than he attacked and defeated the usurper Esfiff, put him to death, and recovered all the places the Turks and Russians had made themselves masters of during the rebellion; and then prince Thamas seemed to be established on the throne: but Nadir Khan, to whom Thamas had given the name of *Thamas Kouli Khan*, that is, *the Slave of Thamas*, thinking his services not sufficiently rewarded, and pretending that the king had a design against his life, or at least to set him aside, conspired against his sovereign, and put him to death, as is supposed: after which, he usurped the throne, styling himself *Shah Nadir*, or *King Nadir*.

He afterwards laid siege to Candahor, of which a son of Mereweis had possessed himself. While he lay at this siege, the court of the Great Mogul being distracted with factions, one of the parties invited Shah Nadir to come to their assistance, and betrayed the Mogul into his hands. He thereupon marched to Delhi, the capital of India, and summoned all the viceroys and governors of provinces to attend him, and bring with them all the treasures they could raise; and those that did not bring as much as he expected, he tortured and put to death. Having thus amassed the greatest treasure that ever prince was master of, he returned to Persia, giving the Mogul his liberty, on condition of his resigning the provinces on the west side of the Indus to the crown of Persia. He afterwards made a conquest of Usbeck Tartary, and plundered Bochara the capital city. Then he marched against the Dagistan Tartars; but lost great part of his army in their mountains, without fighting. He defeated the Turks in several engagements; but laying siege to Bagdad, was twice compelled to raise the siege. He proceeded to change the religion of Persia to that of Omar, hanged up the chief priests, put his own son to death, and was guilty of such cruelty, that he was at length assassinated by his own relations, anno 1747. A contest upon this ensued between these relations for the crown, which has rendered Persia a scene of the most horrible confusion for upwards of 40 years.

38 Different pretenders to the throne of Persia. The reader will form some notion of the troubles of this unhappy country from the following series of pretenders to the throne between the death of Nadir and the accession of Kerim Khan. We give it from Francklin's Observations. "1st, Adil Shah.—2d, Ibraheem Shah.—3d, Shah Rokh Shah.—4th, Suleeman Shah.—5th, Ismaeel Shah.—6th, Azad Khan Af-

ghan.—7th, Hossun Khan Kejar.—8th, Ali Merdan Khan Bukhteari.—9th, Kerim Khan Zund.

"Their reigns, or more properly the length of time they respectively governed with their party, were as follows: Adil Shah, nine months. Ibraheem Shah, six months. Shah Rokh Shah, after a variety of revolutions, at length regained the city of Meschid: he is now alive (1787), and above 80 years of age, reigning in Khorasan, under the direction of his son Nussir Ullah Meerza. Suleeman Shah and Ismaeel Shah in about forty days were both cut off, almost as soon as they were elevated. Azad Khan Afghan, one of Kerim Khan's most formidable rivals and competitors, was subdued by him, brought prisoner to Shirauz, and died there a natural death. Hossun Khan Kejar, another of Kerim Khan's competitors, was besieging Shirauz, when his army suddenly mutinied and deserted him. The mutiny was attributed to their want of pay. A party sent by Kerim Khan took him prisoner. His head was instantly cut off, and presented to Kerim Khan. His family were brought captives to Shirauz. They were well treated, and had their liberty given them soon after, under an obligation not to quit the city. Ali Merdan Khan was killed by a musket-shot as he was walking on the ramparts of Maschid encouraging his men. Kerim Khan Zund, by birth a Curdistan, was a most favourite officer of Nadir Shah, and at the time of his death was in the southern provinces. Shirauz and other places had declared for him. He found means at last, after various encounters with doubtful success, completely to subdue all his rivals, and finally to establish himself as ruler of all Persia. He was in power about 30 years; the latter part of which he governed Persia under the appellation of *vakeel* or *regent*, for he never would receive the title of Shah. He made Shirauz the chief city of his residence, in gratitude for the assistance he had received from its inhabitants and those of the southern provinces. He died in the year 1779, regretted by all his subjects, who esteemed and honoured him as the glory of Persia.

60 "When the death of Kerim Khan was announced in the city, much confusion arose; two and twenty of the principal officers of the army, men of high rank and family, took possession of the ark, or citadel, with a resolution to acknowledge Abul Futtah Khan (the eldest son of the late Vakeel) as their sovereign, and to defend him against all other pretenders; whereupon Zikea Khan, a relation of the late Vakeel by the mother's side, who was possessed of immense wealth, enlisted a great part of the army into his pay, by giving them very considerable bounties. Zikea Khan was of the tribe of Zund (or the Lackeries); a man remarkably proud, cruel, and unrelenting. Having assembled a large body of troops, he immediately marched them to the citadel, and laid close siege to it for the space of three days; at the expiration of which, finding he could not take it by force, he had recourse to treachery. To each of the principal khans he sent a written paper, by which he swore upon the Koran, that if they would come out and submit to him, not a hair of their heads should be touched, and that they should have their effects secured to them. Upon this a consultation was held by them; and it appearing that they could not subsist many days longer, they agreed to

Perfia. surrender themselves, firmly relying on the promises that had been made them. Zikea Khan, in the mean time, gave private orders for the khans to be seized, and brought separately before him as they came out of the citadel. His orders were strictly obeyed, and these deluded men were all massacred in his presence: he was seated the whole time, feasting his eyes on the cruel spectacle.

64 Murdered. "Zikea Khan's tyranny became soon intolerable, and he was cut off by his own body-guard, when Abul Futtah Khan, who was at the time in the camp, was proclaimed king by the unanimous voice of the troops, whom he immediately led back to Shirauz. On his arrival he was acknowledged as sovereign by all ranks of people, and took quiet possession of the government.

65 Mahomed Sadick Khan attempts to seize the government, "Mahomed Sadick Khan, only brother of the late Kerim Khan, who had during that prince's life filled the high office of beglerbeg of Fars, and had been appointed guardian of his son Abul Futtah Khan, was at this period governor of the city of Buffora, which had been taken by the Persians, previous to the vakeel's death. Upon hearing the news of his brother's decease he became ambitious of reigning alone, and from that instant formed schemes for the destruction of his nephew; but as it was necessary for him to be on the spot for the advancement of his views, he determined to withdraw the Persian garrison from Buffora, who were all devoted to his interest: accordingly he evacuated that place, and marched immediately for Shirauz.

"The news of Sadick Khan's approach threw the inhabitants of Shirauz into the greatest consternation: their minds were variously agitated on the occasion; some, from his known public character, expected he would honestly fulfil the commands of his deceased brother; others, who had been witnesses to the confusion of former times, on similar occasions, rightly imagined that he would set up for himself; and indeed this proved to be the case: for having entered Shirauz a very few days after, he caused Abul Futtah Khan to be seized, deprived of sight, and put into close confinement.

66 Which he effects. "After this event, Sadick Khan openly assumed the government. As soon as the intelligence reached Ali Murad Khan, who was at Ispahan, that lord instantly rebelled: deeming himself to have an equal right to the government with Sadick Khan, as in fact he had, he could ill brook the thought of being obedient to him, and openly declared himself a competitor for the empire. Persia was by this means again involved in all the horrors of a civil war. Ali Murad Khan indeed took possession of Shirauz, assumed the government, and gave to the empire the flattering prospect of being settled under the government of one man; but this prospect was soon obscured by the power and credit acquired by Akau Mahomed Khan."

67 Akau Mahomed Khan collects troops, and is proclaimed at Mazanderan and Ghilan. On the night following Kerim Khan's death, this man found means to make his escape from Shirauz, and fled to the northward, where collecting some troops, he soon made himself master of Mazanderan and Ghilan, and was proclaimed nearly about the time that Ali Murad Khan had taken Shirauz. "It is remarkable (says our author), that from his first entering into competition for the government, he has been successful in every battle which he has fought. He is an eunuch,

having been made so whilst an infant, by the command of Nadir Shah, but possesses great personal bravery."

Ali Murad Khan, hearing of the success of Akau Mahomed Khan, determined to go against him; but as he was previously proceeding to Ispahan to suppress a rebellion, he fell suddenly from his horse and expired on the spot.

68 "At this period Jaafar Khan, the eldest and only surviving son of Sadick Khan, was governor of Khums: Jaafar Khan asserts his pretensions to the government, and immediately marched with what few troops he had to Ispahan: soon after his arrival he was joined by the greater part of the malcontents, who were then in arms. In this situation he remained some time; but Akau Mahomed Khan coming down upon him with his army, he was obliged to risk his fate in a battle, and, being defeated, fled with the small remains of his troops, taking the road to Shirauz. Soon after finding himself strengthened by an increase of his army, he determined to venture a second engagement with his opponent Akau Mahomed Khan; and for this purpose marched with his army towards Ispahan: the two armies met near Yezdekhaft, when a battle ensued, and Akau Mahomed Khan's superior fortune again prevailing, Jaafar Khan was defeated, and retired to Shirauz, which he quitted on the 25th of June 1787, and shortly after marched his army to the northward, but returned in October without having effected any thing." Such was the state of Persia in 1788. Mr Francklin, from whose excellent *Observations on a Tour made in the years 1786-7* these particulars are mostly extracted, says that Jaafar Khan is the most "likely, in case of success against his opponent, to restore the country to a happy and reputable state; but it will require a long space of time to recover it from the calamities into which the different revolutions have brought it:—a country, if an oriental metaphor may be allowed, once blooming as the garden of Eden, fair and flourishing to the eye;—now, sad reverse! despoiled and leafless by the cruel ravages of war, and desolating contention."

69 As to the air and climate of this country, considering the great extent thereof, it cannot but be very different, according to the situation of its several parts; some being frozen with cold, whilst others are burnt with heat at the same time of the year. The air, wherever it is cold, is dry; but where it is extremely hot, it is sometimes moist. All along the coast of the Persian Gulph, from west to east, to the very mouth of the river Indus, the heat for four months is so excessive, that even those who are born in the country, unable to bear it, are forced to quit their houses, and retire to the mountains; so that such as travel in these parts, at that season, find none in the villages but wretched poor creatures, left there to watch the effects of the rich, at the expence of their own health. The extreme heat of the air, as it is insupportable, so it makes it prodigiously unwholesome; strangers frequently falling sick there, and seldom escaping. The eastern provinces of Persia, from the river Indus to the borders of Tartary, are subject to great heats, though not quite so unwholesome as on the coasts of the Indian Ocean and the Persian Gulph; but in the northern provinces, on the coast of the Caspian Sea, the heat

Perfia. heat is full as great, and, though attended with moisture, as unwholesome as on the coast before mentioned. From October to May, there is no country in the world more pleasant than this; but the people carry indelible marks of the malign influence of their summers, looking all of them of a faint yellow, and having neither strength nor spirits; though, about the end of April, they abandon their houses, and retire to the mountains, which are 25 or 30 leagues from the sea. But this moistness in the air is only in these parts; the rest of Persia enjoys a dry air, the sky being perfectly serene, and hardly so much as a cloud seen to fly therein. Though it seldom rains, it does not follow that the heat admits of no mitigation; for in the night, notwithstanding there is not a cloud to be seen, and the sky is so clear, that the stars alone afford a light sufficient to travel by, a brisk wind springs up, which lasts until within an hour of the morning, and gives such a coolness to the air, that a man can bear a tolerable warm garment. The seasons in general, and particularly in the middle of this kingdom, happen thus: the winter, beginning in November, and lasting until March, is very sharp and rude, attended with frost and snow; which last descends in great flakes on the mountains, but never in the plains. The climate of Shirauz, the capital of Persia Proper, is represented by a traveller who lately visited it, as one of the most agreeable in the world, the extremes of heat and cold being seldom felt. "During the spring of the year the face of the country appears uncommonly beautiful. The flowers, of which they have a great variety, and of the brightest hues, the fragrant herbs, shrubs, and plants, the rose, the sweet basil, and the myrtle, all here contribute to refresh and perfume the natural mildness of the air. The nightingale of the garden (called by the Persians *boolbul bezar daslaan*), the goldfinch, and the linnet, by their melodious warblings at this delightful season of the year, serve to add to the satisfaction of the mind, and to inspire it with the most pleasing ideas. The beauties of nature are here depicted in their fullest extent; the natural historian and the botanist would here meet with ample scope for pursuing their favourite investigations. With such advantages, added to the salubrity of the air, how can it be wondered at that the inhabitants of Shirauz should so confidently assert the pre-eminence of their own city to any other in the world?—or that such beauties should fail of calling forth the poetical exertions of a Hafiz, a Sadi, or a Jami? Their mornings and evenings are cool, but the middle of the day is very pleasant. In summer the thermometer seldom rises above 73 in the day-time, and at night it generally sinks as low as 62. The autumn is the worst season of the year, that being the time when the rains begin to fall, and during the autumnal months it is considered by natives as the most unhealthy; colds, fluxes, and fevers being very general. In winter a vast deal of snow falls, and very thick, but ice is rarely to be found, except on the summits of the mountains, or towards Isfahan, and the more northern parts of Persia. One thing which is most to be esteemed in this country, and renders it preferable to any other part of the world, is their nights, which are always clear and bright; and the dew, that in most places is of so pernicious and dangerous a nature, is

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Climate of
Shirauz.

not of the least ill consequence here: there is none at all in summer, and in the other seasons it is of such a nature, that if the brightest scimitar should be exposed to it all the night, it would not receive the least rust; a circumstance I have myself experienced. This dryness in the air causes their buildings to last a great while, and is undoubtedly one of the principal reasons that the celebrated ruins of Persepolis have endured for so many ages, and, comparatively speaking, in so perfect a state." The great dryness of the air exempts Persia from thunder and earthquakes. In the spring, indeed, there sometimes falls hail; and, as the harvest is then pretty far advanced, it does a great deal of mischief. The rainbow is seldom seen in this country, because there rise not vapours sufficient to form it; but in the night there are seen rays of light shooting thro' the firmament, and followed as it were by a train of smoke. The winds, however brisk, seldom swell into storms or tempests; but, on the other hand, they are sometimes poisonous and infectious on the shore of the Gulph, as all travellers agree. Mr Tavernier says, that at Gombroon people often find themselves struck by a south wind, in such a manner that they cry, "I burn!" and immediately fall down dead. M. le Brun tells us, that he was assured while he was there, that the weather was sometimes so excessively sultry as to melt the seals of letters. At this time the people go in their shirts, and are continually sprinkled with cold water; and some even lie several hours naked in the water. Among the inconveniences consequent from this malign disposition of the air, one of the most terrible is the engendering, in the arms and legs, a kind of long small worms, which cannot be extracted without great danger of breaking them; upon which a mortification ensues.

The soil of Persia is in general stony, sandy, barren, and everywhere so dry, that, if it be not watered, it produces nothing, not even grass; but, where they can turn the water into their plains and valleys, it is not unfruitful. There is a great difference in point of fertility in the different provinces of the empire; and those of Media, Iberia, Hyrcania, and Bactria, are now in a great measure what they were formerly, and surpass most of the others in their productions. All along the Persian Gulph, the soil is still more barren, cattle less plenty, and every thing in a worse condition than anywhere else.

Though there is scarce a province in Persia which does not produce wine, yet the wine of some provinces is much more esteemed than that of others; but Schiras, or, as it is written by Mr Francklin, *Shirauz*, wine is universally allowed to be the very best in Persia: infomuch, that it is a common proverb there, That to live happily one must eat the bread of Yezd, and drink the wine of Schiras.

The grain most common in Persia is wheat; which is wonderfully fair and clean. As for barley, rice, and millet, they only make bread of them in some places, as in Courdestan, when their wheat-bread is exhausted before the return of harvest. They do not cultivate in this country either oats or rye; except where the Armenians are settled, who make great use of the latter in Lent. Rice is the universal aliment of all sorts of people in Persia; for this reason they are extremely careful in its cultivation; for, after they have sown it

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Soil.

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Produce,
&c.

in

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in the same manner as other grain, they in three months time transplant it, root by root, into fields, which are well watered, otherwise it would never attain that perfection in which we find it there; since it is softer, sooner boiled, and more delicious, than the same grain in any other part of the world. Perhaps its taste is, in some measure, heightened by a practice they make use of to give it a glossy whiteness, viz. by cleansing it, after it is beaten out of the husks, with a mixture of flour and salt. Corn ripens exceedingly in this country; so that in some parts they have a threefold crop in the year. The Persian bread is generally very thin, white, and good; and commonly cheap enough.

Metals of all sorts have been found in Persia. Since the reign of Shah Abbas the Great, iron, copper, and lead, have been very common; but there are no gold or silver mines open at present; though, as Persia is a very mountainous country, such might very probably be found, if pains were taken to search them out. There are silver mines in Kirman and Mazanderan, and one not far from Spauhawn; but they cannot be worked for want of wood. Minerals are also found in Persia in abundance; especially sulphur, saltpetre, salt, and alum. Nothing is more common in this country than to meet with plains, sometimes 10 leagues in length, covered entirely with salt, and others with sulphur or alum. In some places salt is dug out of mines, and even used in building houses. Marble, freestone, and slate, are found in great plenty about Hammadan. The marble is of four colours, viz. white, black, red and black, and white and black. Persia yields two sorts of petroleum, or napthe; namely, black and white. In the neighbourhood of Tauris they find azure; but it is not so good as that brought from Tartary. Among the most valuable productions of Persia are the precious stones called *turquoises*, of which there are several rocks or mines.

The horses of Persia are the most beautiful of the East, though they are not so much esteemed as those of Arabia; so great, however, is the demand for them, that the finest ones will fetch from 90l. to 450l. sterling. They are higher than the English saddle horses; straight before, with a small head, legs wonderfully slender, and finely proportioned; they are mighty gentle, good travellers, very light and sprightly, and do good service till they are 18 or 20 years old. The great numbers of them sold into Turkey and the Indies, though none can be carried out of the kingdom without special licence from the king, is what makes them so dear. Next to horses we may reckon mules, which are much esteemed here, and are very fine; and next to these we may justly place asses, of which they have in this country two sorts; the first bred in Persia, heavy and doltish, as asses in other countries are; the other originally of an Arabian breed, the most docile and useful creature of its kind in the world. They are used wholly for the saddle; being remarkable for their easy manner of going, and are very sure-footed, carrying their heads lofty, and moving gracefully. Some of them are valued at 20l. sterling. The mules here are also very fine; they pace well, never fall, and are seldom tired. The highest price of a mule is about 45l. sterling. Camels are also numerous in Persia, and very serviceable: they call them *kechty-krouch-konion*, i. e. "the ships of the land;" because the inland trade is

carried on by them as the foreign is by ships. Of these camels there are two sorts, the northern and southern: the latter, which is much the smaller, but swifter, will carry a load of about 700 weight, and trot as fast as a horse will gallop; the other will travel with a load of 1200 or 1300 weight; both are profitable to their masters, as costing little or nothing to keep. They travel without halter or reins; grazing on the road from time to time, notwithstanding their load. They are managed entirely by the voice; those who direct them making use of a kind of song, and the camel moving brisker, or at its ordinary pace, as they keep a quicker or slower time. The camels shed their hair so clean in the spring, that they look like scalded swine; but then they are pitched over, to keep the flies from stinging them. The camels hair is the most profitable fleece of all the tame beasts: fine stuffs are made of it; and in Europe, hats, with a mixture of a little beaver.

As beef is little eaten in Persia, their oxen are generally employed in ploughing, and other sorts of labour. Hogs are nowhere bred in Persia, if we except a province or two on the borders of the Caspian Sea. Sheep and deer are very common throughout all Persia.

Of wild beasts, the number is not great in that country, because there are few forests; but where there are any, as in Hyrcania, now called *Tabristan*, abundance of lions, bears, tigers, leopards, porcupines, wild boars, and wolves, are to be found; but the last are not so numerous as any of the other species.

There are but few insects in this country; which may be ascribed to the dryness of the climate. In some provinces, however, there is an infinite number of locusts or grasshoppers, which fly about in such clouds as to darken the air. In certain parts of the Persian dominions they have large black scorpions, so venomous, that such as are stung by them die in a few hours. In others they have lizards, frightfully ugly, which are an ell long, and as thick as a large toad, their skins being as hard and tough as that of the sea-dog: they are said to attack and kill men sometimes; but that may be doubted. The southern provinces are infested with gnats; some with long legs, like those we call *midges*; and some white, and as small as fleas, which make no buzzing, but sting suddenly, and so smartly, that the sting is like the prick of a needle. Among the reptiles is a long square worm, called by the inhabitants *bazar-pey*, i. e. "thousand feet," because its whole body is covered with feet; it runs prodigiously fast; and its bite is dangerous, and even mortal, if it gets into the ear.

There are in Persia all the several sorts of fowls which we have in Europe, but not in such great plenty; excepting, however, wild and tame pigeons, of which vast numbers are kept all over the kingdom, chiefly on account of their dung: which is the best manure for melons. It is a great diversion among the lower sort of people in town and country to catch pigeons, though it be forbidden: for this purpose they have pigeons so taught, that, flying in one flock, they surround such wild ones as they find in the field, and bring them back with them to their masters. The partridges of this country are the largest and finest in the world, being generally of the size of our fowls. Geese, ducks, cranes, herons,

Persia

Perſia. herons, and many other ſorts of water-fowl, are common here; as are likewiſe nightingales, which are heard all the year, but chiefly in the ſpring; martlets, which learn whatever words are taught them; and a bird called *noura*, which chatters inceſſantly, and repeats whatever it hears. Of birds of a larger ſize, the moſt remarkable is the pelican, by the Perſians called *tacab*, i. e. "water-carrier;" and alſo *miſc*, i. e. "ſheep;" because it is as large as one of thoſe animals*. There are in Perſia various birds of prey. Some of their falcons are the largeſt and fineſt in the world: the people take great pains to teach them to fly at game; the Perſian lords being great lovers of falconry, and the king having generally 800 of this ſort of birds, each of which has a perſon to attend it.

* See *Pelicanus*.

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Mountains,
rivers, and
ſeas.

There is perhaps no country in the world which, generally ſpeaking, is more mountainous than Perſia; but many of them yield neither ſprings nor metals, and but few of them are ſhaded with trees. It is true, ſome of the chief of them are ſituated on the frontiers, and ſerve as a kind of natural ramparts, or bulwarks, to this vaſt empire. Among the latter are the mountains of Caucasus and Ararat, ſometimes called the *mountains of Dagheſtan*, which fill all the ſpace between the Euxine and Caſpian ſeas: thoſe called *Taurus*, and the ſeveral branches thereof, run through Perſia from Natolia to India, and fill all the middle of the country.

As to rivers, except the Araxes, which riſes in the mountains of Armenia, and falls into the Kur or Cyrus before it reaches the Caſpian Sea, there is not one navigable ſtream in this country. The Oxus divides Perſia on the north-eaſt from Uſbeck Tartary. The Indus alſo may now be reckoned among the rivers of Perſia, as the provinces lying to the weſt of that river are now in poſſeſſion of that crown: this river is ſaid to run a courſe of more than 1000 miles, and overflows all the low grounds in April, May, and June.

The ſeas on the ſouth of Perſia are, the Gulph of Perſia or Baſſora, the Gulph of Ormus, and the Indian Ocean. The only ſea on the north is the Caſpian, or Hyrcanian ſea; which is more properly a lake, having no communication with any other ſea. Theſe ſeas, together with the lakes and rivers, ſupply Perſia with plenty of fiſh. The Caſpian ſea contains very fine fiſh on one ſide; and the Perſian Gulph on the other is believed to have more fiſh than any other ſea in the world. On the coaſts of this gulph is taken a ſort of fiſh, for which they have no particular name: its fleſh is of a red colour, very delicious, and ſome of them weigh 200 or 300 pounds. The river-fiſh are chiefly barbels; but far from being good. Thoſe of the lakes are carps and ſhads. In the river at Spauhawn are a great number of crabs, which crawl up the trees, and live night and day under the leaves, whence they are taken; and are eſteemed very delicious food.

75
Woods, &c.
in the Per-
ſian gulph.

In his voyage from Gombroon up the Perſian Gulph, Mr Ives makes mention of ſeveral iſlands, named Kiſme, Polloar, Kyes, Inderabie, Shittewar, and Buſheel. Some of theſe were quite barren; on others there were a few trees and buſhes, with little fiſhing towns, and a few ſmall veſſels lying along ſhore. The date trees were thinly ſcattered among the hills; but tho' a ſmall portion of green might here and there be diſcovered, yet ſuch was the barrenneſs of theſe iſlands in

general, that it was for ſome time a matter of ſurpriſe how ſheep and goats could poſſibly ſubſiſt upon them. On cloſer examination, however, it was found, that the ſoil produced a kind of ſmall-leaved juicy mallows, on which theſe animals principally feed. The Perſian coaſt, as they ſailed along, afforded a moſt romantic proſpect, appearing at firſt to be one continued rock, rent and torn aſunder by earthquakes; but it was afterwards diſcovered, that ſome part of it was only ſand hardened by the rains and ſun.

Perſia.

Narban Point terminates in a long and low piece of land, which runs off into the gulph from the foot of the Perſian hills. Between this point and the main land is a channel, in which a ſhip of 900 tons burden might eaſily ride. The Portuguese had formerly a ſettlement here, the remains of which are ſtill to be ſeen. A large river empties itſelf into the ſea at this place; and Mr Ives obſerves, that "Providence ſeems here to have allotted a ſpot of ground amidſt unhoſpitable rocks and deſerts, capable of affording the kind production of vegetables for man and beaſt." The adjacent country is ſubject to the Arabs.

Through all the Perſian Gulph Mr Ives remarks, that the ſpring-water on the iſlands is much better than that on the continent; and the water neareſt the ſea on the iſlands has greatly the advantage over that which is found in the middle parts. This holds good, however, only in thoſe parts which are near the ſea; for about 12 miles up the country, both on the Perſian and Arabian ſide of the gulph, the water is very good. At the iſland called Bareen or Baharen, divers go down to the bottom of the ſea, at certain known depths, and come up again with their veſſels filled with freſh water. This freſh water is found in holes or little natural wells, ſome fathoms below the ſurface of the ſea. The Arabs have certain marks on the iſland to teach them where to dive for the freſh water. Mr Ives was aſſured by an Arabian merchant, that he himſelf had diſcovered a ſpring upon the ſhore, by which one of theſe wells was ſerved. He put into this ſpring a bit of a heavy ſtick; and in two or three days an Arabian diver brought it to him again from the bottom of one of theſe holes.

The Engliſh, and other nations, trade with the Perſians ſeveral ways, particularly by the gulph of Ormus at Gombroon, and by the way of Turkey. A trade alſo was not many years ſince opened by the Engliſh with Perſia through Ruſſia and the Caſpian Sea; but that is now diſcontinued, having been prohibited by the court of Ruſſia, who were apprehenſive that the Engliſh would teach the Perſians to build ſhips, and diſpute the navigation of the Caſpian Sea with them. The principal commodities and manufactures of Perſia are, raw and wrought ſilks, mohair camblets, carpets, leather; for which, and ſome others, the European merchants exchange chiefly woollen manufactures; but the trade is carried on altogether in European ſhipping, the Perſians having ſcarce any ſhips of their own, and the Ruſſians the ſole navigation of the Caſpian Sea. There is not a richer or more profitable trade in the world, than that which is carried on between Gombroon and Surat in the Eaſt Indies; and the Engliſh Eaſt India company frequently let out their ſhips to transport the merchandiſe of the Banians and Armenians from Perſia to India. The ſhah, or ſovereign.

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Trade.

Persia.

vereign of Persia, is the chief merchant; and he usually employs his Armenian subjects to traffic for him in every part of the world. The king's agents must have the refusal of all merchandise, before his subjects are permitted to trade. It is computed that Persia produces yearly upwards of 22,000 bales of silk, chiefly in the provinces of Ghilan and Mazanderan, each bale weighing 263 pounds. Vast quantities of Persian silk used to be imported into Europe, especially by the Dutch, English, and Russians, before the civil wars began. The goods exported from Persia to India are, tobacco, all sorts of fruits, pickled and preserved, especially dates, marmalade, wines, distilled waters, horses, Persian feathers, and Turkey leather of all sorts and colours, a great quantity whereof is also exported to Muscovy and other European countries. The exports to Turkey are, tobacco, galls, thread, goats hair, stuffs, mats, box-work, and many other things. As there are no posts in the east, and trading by commission, with the use of bills of exchange, is little known, traffic must proceed in a very awkward heavy manner, in comparison of that of Europe.

77
Money.

The most current money of Persia are the abassees, worth about 1 s. 4 d. sterling; they are of the finest silver. An abassee is worth two mahmoudees; a mahmoude, two shahes; and a shah, ten single or five double casbeghes: these last pieces are of brass, the others of silver; for gold is not current in trade. The shahes are not very common; but mahmoudees and casbeghes are current everywhere. Horses, camels, houses, &c. are generally sold by the toman, which is an imaginary coin, worth 200 shahes, or 50 abassees; and they usually reckon their estates that way. Such a one, they say, is worth so many tomans, as we say pounds in England.

78
Govern-
ment.

Persia is an absolute monarchy, the lives and estates of the people being entirely at the disposal of their prince. The king has no council established, but is advised by such ministers as are most in favour; and the resolutions taken among the women of the harem frequently defeat the best laid designs. The crown is hereditary, excluding only the females. The sons of a daughter are allowed to inherit. The laws of Persia exclude the blind from the throne; which is the reason that the reigning prince usually orders the eyes of all the males of the royal family, of whom he has any jealousy, to be put out. The king has generally a great many wives, which it would be death for any one, besides the eunuchs, who have the superintendence of them, to look at, or even see by accident; wherefore, when he travels, notice is given to all men to quit the road, nay their very houses, and to retire to a great distance.

The prime minister is called *attemaet doulet*, which signifies the director of the empire, and also *vizir azem*, or the great supporter of the empire; as he alone almost sustains the whole weight of the administration. This minister's chief study is to please his master, to secure to himself an ascendant over his mind, and to avoid whatever may give him any uneasiness or umbrage. With this view, he never fails to flatter him, to extol him above all the princes upon earth, and to throw a thick veil over every thing that might help to open his eyes, or discover to him the weakness of the state. He even takes particular care to keep the king in utter

Persia.

ignorance, to hide from him, or at least to soften, all unwelcome news; and, above all, to exalt immoderately every the least advantage he obtains over his enemies. As he takes these methods, which indeed are and must be taken, more or less, by the ministers of every despotic prince, to secure the favour and confidence of his master; so the inferior officers and governors of provinces are obliged to employ all the means in their power to secure the prime minister's, they depending no less upon him than he does upon the king. There is a gradation of despotism and slavery, down from the prime minister to the lowest retainer to the court, or dependent on the government. Children are sometimes in Persia required by the king to cut off the ears and nose, and even to cut the throats of their parents; and these orders cannot be objected to, without endangering their own lives. Indeed their baseness and mercenariness are such, that they will perpetrate such atrocious deeds without the least scruple or difficulty, when they have a promise or expectation of possessing their posts. The prime ministers, notwithstanding the precarious footing on which they stand, in effect of their abilities or good fortune, sometimes continue in their employments during life, or, if removed, are only banished to some city, where they are allowed to spend the remainder of their days in a private station.

Next to the prime minister are the nadir, or grand-master of the household; the mehter, or groom of the chambers, who is always a white eunuch; the *mirakbor-bashe*, or master of the horse; the *mir-shikar-bashe*, or great huntsman and falconer; the *divan-beggi*, or chief-justice, to whom there lies an appeal from the *deroga*, or the lieutenant of police, in every town; the *vacka-nuviez*, or recorder of events, or first secretary of state; the *muslau-she-elmenaleck*, or master of the accounts and finances of the kingdom; the *numes-humbashes*, or the king's chief physicians; the *shickada-fibashe*, or inspector of the palace, and regulator of rank at court; and the khans, or governors of provinces, under whom are other governors, called *soltans*, appointed also by the king.

Civil matters are all determined by the *cazi*, and ecclesiastical ones (particularly divorces) by the *sheick-el-selleum*, or head of the faith; an officer answering to the *mufti* among the Turks; under him are the *sheick-el-selom*, and *cadi*, who decide in all matters of religion, and make all contracts, testaments, and other public deeds, being appointed by the king in all the principal towns; and next to these are the *pichnamas*, or directors of the prayers; and the *moullahs*, or doctors of the law.

Justice is carried on in Persia in a very summary manner; the sentence, whatever it may be, being always put into execution on the spot. Theft is generally punished with the loss of nose and ears; robbing on the road, by ripping up the belly of the criminal, in which situation he is exposed upon a gibbet in one of the most public parts of the city, and there left until he expires in torment.

There is no nobility in Persia, or any respect shown to a man on account of his family, except to those who are of the blood of their great prophet or patriarchs; but every man is esteemed according to the post he possesses; and when he is dismissed, he loses

his

his honour, and he is no longer distinguished from the vulgar.

With respect to the forces of Persia, their two bodies, called the *Kortshies* and *Goulans*, that serve on horseback, are well kept and paid, and may amount, the former to about 22,000, and the latter to about 18,000. The *Kortshies* are descended from an ancient but foreign race; and the *Goulans* are either Georgian renegadoes or slaves, or the children of slaves of all nations. The infantry, called *Tangtchies*, are picked out from among the most robust and vigorous of the peasants, and compose a body of 40,000 or 50,000. The Persians have few fortified towns, and had no ships of war, till Kouli Khan built a royal navy, and among them had a man of war of 80 guns; but since the death of that usurper, we hear no more of their fleet.

The arms of the king of Persia are a lion couchant, looking at the sun as he rises over his back. His usual title is *Shaw* or *Patsbarw*, the "disposer of kingdoms." They add also to the king's titles those of *sultan*, and *chan* or *cham*, which is the title of the Tartar sovereigns. To acts of state the Persian monarch does not subscribe his name; but the grant runs in this manner, viz. *This act, or edict, is given by him whom the universe obeys.*

79
Manners,
&c.

The ancient Persians are known to have been exceedingly voluptuous and effeminate. After the conquest of the empire by Alexander, the Greek discipline and martial spirit being in part communicated to them, they became much more formidable; and hence the Parthians were found to be a match not only for the Syro-Macedonian princes, but even for the Romans. Of their manners we know little or nothing, but that to their valour and military skill they joined in a surprising degree all the luxury and dissipation of the ancient Persians.

The modern Persians, like the Turks, plundering all the adjacent nations for beauties to breed by, are men of a good stature, shape, and complexion; but the Gaures, or ancient Persians, are homely, ill-shaped, and clumsy, with a rough skin, and olive complexions. In some provinces, not only the complexions but the constitutions of the inhabitants, suffer greatly by the extreme heat and unwholesomeness of the air. The Persian women, too, are generally handsome and well-shaped, but much inferior to those of Georgia and Circassia. The men wear large turbans on their heads, some of them very rich, interwoven with gold and silver; a vest, girt with a sash; and over it a loose garment, something shorter; with sandals, or slippers, on their feet. When they ride, which they do every day, if it be but to a house in the same town, they wear pliant boots of yellow leather; the furniture of their horses is extremely rich, and the stirrups generally of silver: whether on horseback or on foot, they wear a broad sword and a dagger in their sash. The dress of the women does not differ much from that of the men; only their vests are longer, and they wear stiffened caps on their heads, and their hair down.

With respect to outward behaviour, says an intelligent traveller, "The Persians are certainly the Parisians of the East. Whilst a rude and insolent demeanor peculiarly marks the character of the Turkish nation towards foreigners and Christians, the behaviour of

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the Persians would, on the contrary, do honour to the most civilized nations: they are kind, courteous, civil, and obliging, to all strangers, without being guided by those religious prejudices so very prevalent in every other Mahometan nation; they are fond of inquiring after the manners and customs of Europe, and in return very readily afford any information in respect to their own country. The practice of hospitality is with them so grand a point, that a man thinks himself highly honoured if you will enter his house and partake of what the family affords; whereas, going out of a house without smoking a calcan, or taking any other refreshment, is deemed in Persia a high affront."

Their usual drink is water and sherbet, as in other Mahometan countries, wine being prohibited; but of all Mahometan nations, they pay the least regard to this prohibition. Many of them drink wine publicly, and almost all of them in private (excepting those who have performed the pilgrimage to Mecca, and men of religion): they also are very liable to be quarrelsome when inebriated, which is often attended with fatal consequences. They eat opium, but in much less quantities than the Turks; and indeed in every thing they say or do, eat or drink, they make a point to be as different from this nation as possible, whom they detest to a man, beyond measure; esteeming Jews and Christians superior to them, and much nearer to salvation.

Every one knows, that the religion of the Persians is Mahometan; and that they are of the sect of Ali, for whom they entertain the most extravagant veneration. Mr Francklin heard one of his guides on the road reprove another for the expression *O God! O Ali!* "No, no (said his zealous companion), *Ali first, God second!*" This attachment is the source of their hatred to the Turks, and of many strange customs among themselves, which we have not room to enumerate; a few, however, must be mentioned.

"Their mode of living is as follows: They always rise at daybreak, in order to perform their devotions. Their first prayer is denominated *numaz soobh*, or the morning prayer; it is said before sunrise, after which they eat a slight meal called *nashba* or breakfast; this consists of grapes, or any other fruits of the season, with a little bread, and cheese made of goat's milk; they afterwards drink a cup of very strong coffee without milk or sugar; then the calcan or pipe is introduced. The Persians, from the highest to the lowest ranks, all smoke tobacco.

"Their second hour of prayer is called *numaz zò-bur*, or mid-day prayer, and is always repeated when the sun declines from the meridian. Their dinner, or *chashb*, which is soon after this prayer, consists of curds, bread, and fruits of various kinds; animal food not being usual at this meal.

"The third hour of prayer is called *numaz àsur*, or the afternoon prayer, said about four o'clock.

"The fourth hour of prayer is *numaz shàm*, or evening prayer, which is said after sun set; when this is finished, the Persians eat their principal meal, called *shàmi* or supper. This generally consists of a pilau, dressed with rich meat-sauces, and highly seasoned with various spices: sometimes they eat *kibaab* or roast meat. When the meal is ready, a servant brings notice thereof, and at the same time presents a ewer and water; they

Persia.

80
Anecdotes
of their religion.

Persia.

they then wash their hands, which is an invariable custom with the Persians both before and after eating. They eat very quick, conveying their food to their mouths with their fingers; the use of knives and forks being unknown in Persia. Sherbets of different sorts are introduced, and the meal concludes with a desert of delicious fruits. The supper being finished, the family sit in a circle, and entertain each other by relating pleasant stories (of which they are excessively fond), and also by repeating passages from the works of their most favourite poets, and amusing themselves at various kinds of games. The fifth and last prayer is styled *numaz akbir*, the last prayer; or sometimes *numaz shéb*, or the night prayer, repeated about an hour after supper."

81

Remarkable law respecting marriage.

The most remarkable law among the Persians respects marriage. A man may divorce his wife when he chooses, without assigning any other reason for the divorce than that it is his pleasure. If he should change his mind, he may again marry her, divorce her a second time, and a third time marry her; but here this privilege stops. No man is allowed to marry the woman whom he has thrice divorced. A widow is obliged to mourn four months for her deceased husband before she can be married to another; but a concubine may form a new connection the instant that her keeper expires.

82

Ceremony of naming their children.

At the naming of children in Persia, Mr Francklin informs us that the following ceremony is observed: "The third or fourth day after the child is born, the friends and relations of the woman who has lain-in assemble at her house, attended by music and dancing girls hired for the occasion; after playing and dancing some time, a mullah or priest is introduced, who, taking the child in his arms, demands of the mother what name she chooses the infant should be called by; being told, he begins praying, and after a short time applies his mouth close to the child's ear, and tells him distinctly three times (calling him by name) to remember and be obedient to his father and mother, to venerate his Koran and his prophet, to abstain from those things which are unlawful, and to practise those things which are good and virtuous. Having repeated the Mahometan profession of faith, he then redelivers the child to his mother; after which the company are entertained with sweetmeats and other refreshments, a part of which the females present always take care to carry away in their pockets, believing it to be the infallible means of their having offspring themselves."

83

Intellectual excellence.

The Persians excel more in poetry than any other sort of literature; and astrologers are now in as great reputation in Persia as the magi were formerly. Their books are all manuscripts, the art of printing having not yet been introduced among them: they excel indeed in writing, and have eight different hands. They write from the right hand to the left, as the Arabs do. In their short hand, they use the letters of the alphabet; and the same letters, differently pointed, will have 20 different significations. In short, the Persians are born with as good natural parts as any people in the East, but make a bad use of them; being great dissemblers, cheats, liars, and flatterers, and having a strong propensity to voluptuousness, luxury, idleness, and in-

dolence; vices indeed to which the Asiatics in general are much addicted.

PERSIAN WHEEL: See HYDROSTATICS.

PERSICA, the PEACH, is by Linnæus referred to the same class and genus with amygdalus; however, as they are so commonly reckoned to be different genera, we have thought proper to distinguish them. There are a great variety of peach-trees planted in the gardens, some of which are preserved only for the beauty of their flowers, but most of them for the sake of the fruit. Of those remarkable for the beauty of their flowers the principal are, 1. The vulgaris, or common peach-tree, with double flowers, which is a very great ornament in gardens, producing very large double flowers of a beautiful red or purple colour, and growing to a considerable size. 2. The humilis, or dwarf-almond. 3. The africana, or double-flowering dwarf-almond. These two reach not above the height of three or four feet, though their flowers are of equal beauty with the former.

Of the peach-trees cultivated for the sake of their fruit there are a great number, to describe which particularly would exceed the proper bounds of this article. They are raised from the stones of the fruit, which should be planted in autumn on a bed of light dry earth, about three inches deep and four inches asunder. In the winter the beds should be covered with mulch to protect them from the frost. In this bed they should remain for a year; when they are to be taken up and planted in a nursery, where they are to remain one or two years; after which they must be removed to the places where they are to continue.

PERSICANA, in botany. See POLYGONUM.

PERSICUS SINUS, in anc. geogr. (Mela, Pliny); a part of the sea which the Romans called *Mare Rubrum*, and the Greeks *Mare Erythraum*; washing Arabia Felix on the east, between which and Carmania, entering into the land, it washes Persis on the south. Its large mouth consists of straight sides, like a neck, and then the land retiring equally a vast way, and the sea surrounding it in a large compass of shore, there is exhibited the figure of a human head (Mela). Theophrastus calls this bay *Sinus Arabicus*, a name it equally claims with *Persicus*, only for distinction sake *Persicus* is appropriated to it by others.

PERSIMON. See DIOSPYROS.—From the persimon is made a very palatable liquor in the following manner: As soon as the fruit is ripe, a sufficient quantity is gathered, which is very easy, as each tree is well stocked with them. These persimon apples are put into a dough of wheat or other flour, formed into cakes, and put into an oven, in which they continue till they are quite baked and sufficiently dry, when they are taken out again: then, in order to brew the liquor, a pot full of water is put on the fire, and some of the cakes are put in: these become soft by degrees as the water grows warm, and crumble in pieces at last; the pot is then taken from the fire, and the water in it well stirred about, that the cakes may mix with it: this is then poured into another vessel, and they continue to steep and break as many cakes as are necessary for a brewing: the malt is then infused, and they proceed as usual with the brewing. Beer thus prepared is reckoned much preferable to other beer. They like-

wife

Perſus. *Perſius.* wiſe make brandy of this fruit in the following manner: having collected a ſufficient quantity of perſimons in autumn, they are altogether put into a veſſel, where they lie for a week till they are quite ſoft: then they pour water on them, and in that ſtate they are left to ferment of themſelves, without promoting the fermentation by any addition. The brandy is then made in the common way, and is ſaid to be very good, eſpecially if grapes (in particular of the ſweet ſort), which are wild in the woods, be mixed with the perſimon fruit. Some perſimons are ripe at the end of September, but moſt of them later, and ſome not before November and December, when the cold fiſt overcomes their acrimony. The wood of this tree is very good for joiners instruments, ſuch as planes, handles to chiſels, &c. but if after being cut down it lies expoſed to ſunſhine and rain, it is the fiſt wood which rots, and in a year's time there is nothing left but what is uſeleſs. When the perſimon trees get once into a field, they are not eaſily got out of it again, as they ſpread ſo much.

PERSIS, a Roman lady, whom St Paul ſalutes in his epiſtle to the Romans (xvi. 12.), and whom he calls his beloved ſiſter. He ſays ſhe has laboured much for the Lord, and ſtill labours. Nothing elſe of her life is come to our knowledge, nor do we know that ſhe is honoured by any church; which is ſomething ſingular.

PERSIUS (Flaccus Aulus), a Latin poet in the reign of Nero, celebrated for his ſatires. He was born, according to ſome, at Volterra in Tuscany; and according to others, at Tigulia, in the gulf Della Specia, in the year 34. He was educated till 12 years old at Volterra; and afterwards continued his ſtudies at Rome under Palæmon the grammarian, Virginius the rhetorician, and Cornutus the Stoic philoſopher, who contracted a friendſhip for him. Perſius conſulted that illuſtrious friend in the compoſition of his verſes. Lucian alſo ſtudied with him under Cornutus; and appeared ſo charmed with his verſes, that he was inceſſantly breaking out into acclamations at the beautiful paſſages in his ſatires: an example rarely ſeen in poets of equal rank. He was a ſteady friend, a good ſon, an affectionate brother and parent. He was chaſte, meek, and modeſt: which ſhows how wrong it is to judge of a man's morals by his writings; for the ſatires of Perſius are not only licentious, but ſharp and full of bitternels. He wrote but ſeldom; and it was ſome time before he applied himſelf regularly to it.

Perſius was of a weak conſtitution, and troubled with a bad ſtomach, which was the cauſe of his death in the 30th year of his age. Six of his ſatires remain; in their judgments of which the critics have been much divided, excepting as to their obſcurity, Perſius being indeed the moſt obſcure of all the Latin poets. As a poet, he is certainly inferior to Horace and Juvenal; and all the labours of Iſaac Caſaubon, who has written a moſt learned and elaborate commentary upon him, cannot make him equal to either of them as a ſatiriſt, though in virtue and learning he exceeded them both. He was a profeſſed imitator of Horace; yet had little of Horace's wit, eaſe, and talent at ridicule. His ſtyle is grand, figurative, poetical, and ſuitable to the dignity of the Stoic philoſophy: and hence he ſhines moſt in recommending virtue and integrity: here it is

that ſatire becomes him. He was too grave to court the muſes with ſucceſs: but he had a great ſoul, ſuſceptible of noble ſentiments, which give a grace but to indifferent poetry. His cotemporaries thought highly of him. Quintilian allows, that Perſius, although he wrote but one book of ſatires, acquired a great deal of true glory, *Multum et vera gloria quamvis uno libro Perſius meruit*: and Martial ſays much the ſame thing, *Sapius in libro memoratur Perſius uno*, &c.

PERSON, an individual ſubſtance of a rational intelligent nature. Thus we ſay, an ambaffador repreſents the perſon of his prince; and that, in law, the father and ſon are reputed the ſame perſon.

The word *perſon*, *perſona*, is thought to be borrowed a *perſonando*, from perſonating or counterfeiting; and is ſuppoſed to have fiſt ſignified a mask: becauſe, as Boethius informs us, *in larva concava ſonus volvatur*: and hence the actors who appeared masked on the ſtage were ſometimes called *larvati* and ſometimes *perſonati*. He likewiſe ſays, that as the ſeveral actors repreſented each a ſingle individual perſon, viz. Œdipus, or Chremes, or Hecuba, or Medea; for this reaſon, other people, who were at the ſame time diſtinguiſhed by ſomething in their form, character, &c. whereby they might be known, came likewiſe to be called by the Latins *perſonæ*, and by the Greeks *πρόσωπα*. Again, as actors rarely repreſented any but great and illuſtrious characters, the word came at length to import the mind, as being that whoſe diſpoſitions conſtitute the character. And thus men, angels, and even God himſelf, were called *perſons*. Things merely corporeal, as a ſtone, a plant, or a horſe, were called *hypoplaſes* or *ſuppoſita*, but never *perſons*. Hence the learned ſuppoſe, that the ſame name *perſon* came to be uſed to ſignify ſome dignity, whereby a *perſon* is diſtinguiſhed from another; as a father, huſband, judge, magiſtrate, &c. In this ſenſe we are to underſtand that of Cicero: “Cæſar never ſpeaks of Pompey but in terms of honour and reſpect: he does many hard and injurious things, however, againſt his perſon.”

Perſon we have already defined to mean an individual ſubſtance of a reaſonable nature. Now a thing may be individual two ways: 1. Logically, becauſe it cannot be predicated of any other; as Cicero, Plato, &c. 2. Phyſically; in which ſenſe a drop of water, ſeparated from the ocean, may be called an individual. Perſon is an individual nature in each of theſe ſenſes: logically, according to Boethius, becauſe *perſon* is not ſpoken of univerſals, but only of ſingulars and individuals; we do not ſay the *perſon* of an animal or a man, but of Cicero and Plato: and phyſically, ſince Socrates's hand or foot are never conſidered as perſons. This laſt kind of individual is denominated two ways: poſitively, when the perſon is ſaid to be the whole principle of acting; for to whatever thing action is attributed, that the philoſophers call a *perſon*: and negatively, as when we ſay, with the Thomiſts, &c. that a perſon conſiſts in this, that it does not exiſt in another as a more perfect being. Thus a man, though he conſiſts of two different things, viz. body and ſpirit, is not two perſons; becauſe neither part of itſelf is a complete principle of action, but one perſon, ſince the manner of his conſiſting of body and ſpirit is ſuch as conſtitutes one whole principle of action; nor does he exiſt in any other as a more perfect being; as, for example,

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example, Socrates's foot does in Socrates, or a drop of water in the ocean.

PERSON, in grammar, a term applied to such nouns or pronouns as, being either prefixed or understood, are the nominatives in all inflections of a verb; or it is the agent or patient in all finite or personal verbs. See GRAMMAR.

PERSONAL, any thing that concerns, or is restrained to, the person: thus it is a maxim in ethics, that all faults are personal.

PERSONAL Action, in law, is an action levied directly and solely against the person; in opposition to a real or mixed action. See ACTION.

PERSONAL Goods, or *Chattels*, in law, signifies any moveable thing belonging to a person, whether alive or dead. See CHATTELS.

PERSONAL Identity. See METAPHYSICS, Part III. Chap. iii.

PERSONAL Verb, in grammar, a verb conjugated in all the three persons; thus called in opposition to an impersonal verb, or that which has the third person only.

PERSONALITY, in the schools, is that which constitutes an individual a distinct person.

PERSONATÆ, is the name of the 40th order in Linnæus's Fragments of a Natural Method, consisting of a number of plants whose flowers are furnished with an irregular gaping or grinning petal, which in figure somewhat resembles the snout of an animal. The bulk of the genera of this natural order arrange themselves under the class and order didynamia angiospermia of the Sexual Method.

The rest, although they cannot enter into the artificial class just mentioned, for want of the classic character, the inequality of the stamina; yet, in a natural method, which admits of greater latitude, may be arranged with those plants which they resemble in their habit and general appearance, and particularly in the circumstances expressed in that title.

PERSONIFYING, or PERSONALIZING, the giving an inanimate being the figure, sentiments, and language of a person.

Dr Blair, in his Lectures on Rhetoric, gives this account of personification. "It is a figure, the use of which is very extensive, and its foundation laid deep in human nature. At first view, and when considered abstractly, it would appear to be a figure of the utmost boldness, and to border on the extravagant and ridiculous. For what can seem more remote from the track of reasonable thought, than to speak of stones and trees, and fields and rivers, as if they were living creatures, and to attribute to them thought and sensation, affections and actions? One might imagine this to be no more than childish conceit, which no person of taste could relish. In fact, however, the case is very different. No such ridiculous effect is produced by personification when properly employed; on the contrary, it is found to be natural and agreeable, nor is any very uncommon degree of passion required in order to make us relish it. All poetry, even in its most gentle and humble forms, abounds with it. From prose it is far from being excluded; nay, in common conversation, very frequent approaches are made to it. When we say, the ground *thirsts* for rain, or the earth *smiles* with plenty; when we speak of ambition's

being *restless*, or a disease being *deceitful*; such expressions show the facility with which the mind can accommodate the properties of living creatures to things that are inanimate, or to abstract conceptions of its own forming.

"Indeed, it is very remarkable, that there is a wonderful proneness in human nature to animate all objects. Whether this arises from a sort of assimilating principle, from a propensity to spread a resemblance of ourselves over all other things, or from whatever other cause it arises, so it is, that almost every emotion which in the least agitates the mind bestows upon its object a momentary idea of life. Let a man, by an unwary step, sprain his ankle, or hurt his foot upon a stone, and in the ruffled discomposed moment he will sometimes feel himself disposed to break the stone in pieces, or to utter passionate expressions against it, as if it had done him an injury. If one has been long accustomed to a certain set of objects, which have made a strong impression on his imagination; as to a house, where he has passed many agreeable years; or to fields, and trees, and mountains, among which he has often walked with the greatest delight; when he is obliged to part with them, especially if he has no prospect of ever seeing them again, he can scarce avoid having somewhat of the same feeling as when he is leaving old friends. They seem endowed with life. They become objects of his affection; and, in the moment of his parting, it scarce seems absurd to him to give vent to his feeling in words, and to take a formal adieu.

"So strong is that impression of life which is made upon us, by the more magnificent and striking objects of nature especially, that I doubt not in the least of this having been one cause of the multiplication of divinities in the heathen world. The belief of dryads and naiads, of the genius of the wood and the god of the river, among men of lively imaginations, in the early ages of the world, easily arose from this turn of mind. When their favourite rural objects had often been animated in their fancy, it was an easy transition to attribute to them some real divinity, some unseen power or genius which inhabited them, or in some peculiar manner belonged to them. Imagination was highly gratified, by thus gaining somewhat to rest upon with more stability; and when belief coincided so much with imagination, very slight causes would be sufficient to establish it.

"From this deduction may be easily seen how it comes to pass that personification makes so great a figure in all compositions where imagination or passion have any concern. On innumerable occasions it is the very language of imagination and passion; and therefore deserves to be attended to, and examined with peculiar care. There are three different degrees of this figure, which it is necessary to remark and distinguish, in order to determine the propriety of its use. The first is, when some of the properties or qualities of living creatures are ascribed to inanimate objects; the second, when those inanimate objects are introduced as acting like such as have life; and the third, when they are represented either as speaking to us, or as listening to what we say to them."

The ingenious professor goes on to investigate the nature of personification at considerable length. We shall

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shall give his caution for the use of it in prose compositions, in which he informs us this figure requires to be used with great moderation and delicacy. "The same liberty is not allowed to the imagination there as in poetry. The same assistances cannot be obtained for raising passion to its proper height by the force of numbers and the glow of style. However, addresses to inanimate objects are not excluded from prose; but have their place only in the higher species of oratory. A public speaker may on some occasions very properly address religion or virtue; or his native country, or some city or province, which has suffered perhaps great calamities, or been the scene of some memorable action. But we must remember, that as such addresses are among the highest efforts of eloquence, they should never be attempted unless by persons of more than ordinary genius: for if the orator fails in his design of moving our passions by them, he is sure of being laughed at. Of all frigid things, the most frigid are the awkward and unseasonable attempts sometimes

made towards such kinds of personification, especially if they be long continued. We see the writer or speaker toiling and labouring to express the language of some passion which he neither feels himself nor can make us feel. We remain not only cold, but frozen; and are at full leisure to criticise on the ridiculous figure which the personified object makes, when we ought to have been transported with a glow of enthusiasm. Some of the French writers, particularly Bossuet and Flechier, in their sermons and funeral orations, have attempted and executed this figure not without warmth and dignity. Their works are exceedingly worthy of being consulted for instances of this and of several other ornaments of style. Indeed the vivacity and ardour of the French genius is more suited to this bold species of oratory, than the more correct but less animated genius of the British, who in their prose works very rarely attempt any of the high figures of eloquence."

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P E R S P E C T I V E.

PERSPECTIVE is the art of drawing on a plane surface true resemblances or pictures of objects, as the objects themselves appear to the eye from any distance and situation, real or imaginary.

It was in the 16th century that *Perspective* was revived, or rather reinvented. It owes its birth to painting, and particularly to that branch of it which was employed in the decorations of the theatre, where landscapes were properly introduced, and which would have looked unnatural and horrid if the size of the objects had not been pretty nearly proportioned to their distance from the eye. We learn from Vitruvius, that Agatharchus, instructed by Æschylus, was the first who wrote upon this subject; and that afterwards the principles of this art were more distinctly taught by Democritus and Anaxagoras, the disciples of Agatharchus. Of the theory of this art, as described by them, we know nothing; since none of their writings have escaped the general wreck that was made of ancient literature in the dark ages of Europe. However, the revival of painting in Italy was accompanied with a revival of this art.

The first person who attempted to lay down the rules of perspective was Pietro del Borgo, an Italian. He supposed objects to be placed beyond a transparent tablet, and endeavoured to trace the images which rays of light, emitted from them, would make upon it. But we do not know what success he had in this attempt, because the book which he wrote upon this subject is not now extant. It is, however, very much commended by the famous Egnazio Dante; and, upon the principles of Borgo, Albert Durer constructed a machine, by which he could trace the perspective appearance of objects.

Balthazar Peruzzi studied the writings of Borgo, and endeavoured to make them more intelligible. To him we owe the discovery of points of distance, to which all lines that make an angle of 45 degrees with the ground-line are drawn. A little time after, Guido

Ulbaldi, another Italian, found that all the lines that are parallel to one another, if they be inclined to the ground-line, converge to some point in the horizontal line; and that through this point also, a line drawn from the eye, parallel to them, will pass. These principles put together enabled him to make out a pretty complete theory of perspective.

Great improvements were made in the rules of perspective by subsequent geometers; particularly by professor Gravesande, and still more by Dr Brook Taylor, whose principles are in a great measure new, and far more general than any before him.

In order to understand the principles of perspective, it will be proper to consider the plane on which the representation is to be made as transparent, and interposed between the eye of the spectator and the object to be represented. Thus, suppose a person at a window looks through an upright pane of glass at any object beyond it, and, keeping his head steady, draws the figure of the object upon the glass with a black lead pencil, as if the point of the pencil touched the object itself; he would then have a true representation of the object in perspective as it appears to his eye.

In order to this two things are necessary: first, that the glass be laid over with strong gum-water, which, when dry, will be fit for drawing upon, and will retain the traces of the pencil; and, secondly, that he looks through a small hole in a thin plate of metal, fixed about a foot from the glass, between it and his eye, and that he keeps his eye close to the hole; otherwise he might shift the position of his head, and consequently make a false delineation of the object.

Having traced out the figure of the object, he may go over it again with pen and ink; and when that is dry, put a sheet of paper upon it, and trace it thereon with a pencil: then taking away the paper and laying it on a table, he may finish the picture by giving it the colours, lights, and shades, as he sees them in

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the object itself; and then he will have a true resemblance of the object.

To every person who has a general knowledge of the principles of optics, this must be self-evident: For as vision is occasioned by pencils of rays coming in straight lines to the eye from every point of the visible object, it is plain that, by joining the points in the transparent plane, through which all those pencils respectively pass, an exact representation must be formed of the object, as it appears to the eye in that particular position, and at that determined distance: and were pictures of things to be always first drawn on transparent planes, this simple operation, with the principle on which it is founded, would comprise the whole theory and practice of perspective. As this, however, is far from being the case, rules must be deduced from the sciences of optics and geometry for drawing representations of visible objects on opaque planes; and the application of these rules constitutes what is properly called the art of perspective.

Previous to our laying down the fundamental principles of this art, it may not be improper to observe, that when a person stands right against the middle of one end of a long avenue or walk, which is straight and equally broad throughout, the sides thereof seem to approach nearer and nearer to each other as they are further and further from his eye; or the angles, under which their different parts are seen, become less and less according as the distance from his eye increases; and if the avenue be very long, the sides of it at the farthest end will seem to meet: and there an object that would cover the whole breadth of the avenue, and be of a height equal to that breadth, would appear only to be a mere point. See OPTICS, n° 219, 220.

Having made these preliminary observations, we now proceed to the practice of perspective, which is built upon the following

(Fundamental) THEOREM I.

Let $abcd$ (fig. 1. Plate CCCLXXXIII.) represent the ground-plan of the figure to be thrown into perspective, and $efgb$ the transparent plane through which it is viewed by the eye at E . Let these planes intersect in the straight line kl . Let B be any point in the ground-plan, and BE a straight line, the path of a ray of light from that point to the eye. This will pass through the plane $efgb$ in some point b ; or B will be seen through that point, and b will be the picture, image, or representation of B .

If BA be drawn in the ground plan, making any angle BAK with the common intersection, and EV be drawn parallel to it, meeting the picture-plane or perspective-plane in V , and VA be drawn, the point b is in the line VA so situated that BA is to EV as bA to bV .

For since EV and BA are parallel, the figure $BAbVEbB$ is in one plane, cutting the perspective-plane in the straight line VA ; the triangles BAb , EVb , are similar, and $BA : EV = bA : bV$.

Cor. 1. If B be beyond the picture, its picture b is above the intersection kl ; but if B be between the eye and the picture, as at B' , its picture b' is below kl .

2. If two other parallel lines BA' , ES , be drawn,

and A' , S , be joined, the picture of B is in the intersection of the lines AV and $A'S$.

3. The line BA is represented by bA , or bA is the picture of BA ; and if AB be infinitely extended, it will be represented by AV . V is therefore called the *vanishing point* of the line AB .

4. All lines parallel to AB are represented by lines converging to V from the points where these lines intersect the perspective plane; and therefore V is the vanishing point of all such parallel lines.

5. The pictures of all lines parallel to the perspective-plane are parallel to the lines themselves.

6. If through V be drawn HVD parallel to kl , the angle EVH is equal to BAK .

Remark. The proposition now demonstrated is not limited to any inclination of the picture-plane to the ground-plane; but it is usual to consider them as perpendicular to each other, and the ground-plane as horizontal. Hence the line kl is called the *ground line*, and OH the *horizon-line*; and VK , perpendicular to both, is called the *height of the eye*.

If ES be drawn perpendicular to the picture-plane, it will cut it in a point S of the horizon-line directly opposite to the eye. This is called the *point of sight*, or *principal point*.

7. The pictures of all vertical lines are vertical, and the pictures of horizontal lines are horizontal, because these lines are parallel to the perspective plane.

8. The point of sight S is the vanishing point of all lines perpendicular to the perspective plane.

The above proposition is a sufficient foundation for the whole practice of perspective, whether on direct or inclined pictures, and serves to suggest all the various practical constructions, each of which has advantages which suit particular purposes. Writers on the subject have either confined themselves to one construction, from an affectation of simplicity or fondness for system; or have multiplied precepts, by giving every construction for every example, in order to make a great book, and give the subject an appearance of importance and difficulty. An ingenious practitioner will avoid both extremes, and avail himself of the advantage of each construction as it happens to suit his purpose. We shall now proceed to the practical rules, which require no consideration of intersecting planes, and are all performed on the perspective plane by means of certain substitutions for the place of the eye and the original figure. The general substitution is as follows:

Let the plane of the paper be first supposed to be the ground-plan, and the spectator to stand at F (fig. 2.) Let it be proposed that the ground-plan is to be represented on a plane surface, standing perpendicularly on the line GKI of the plan, and that the point K is immediately opposite to the spectator, or that FK is perpendicular to GL : then FK is equal to the distance of the spectator's eye from the picture.

Now suppose a piece of paper laid on the plan with its straight edge lying on the line GL ; draw on this paper KS perpendicular to GL , and make it equal to the height of the eye above the ground-plan. This may be much greater than the height of a man, because the spectator may be standing on a place much raised above the ground-plan. Observe also that KS must

must be measured on the same scale on which the ground-plan and the distance FK were measured. Then draw HSO parallel to GL. This will be a horizontal line, and (when the picture is set upright on GL) will be on a level with the spectator's eye, and the point S will be directly opposite to his eye. It is therefore called the *principal point*, or *point of sight*. The distance of his eye from this point will be equal to FK. Therefore make SP (in the line SK) equal to FK, and P is the projecting point or substitute for the place of the eye. It is sometimes convenient to place P above S, sometimes to one side of it on the horizontal line, and in various other situations; and writers, ignorant of, or inattentive to, the principles of the theory, have given it different denominations, such as *point of distance*, *point of view*, &c. It is merely a substitute for the point E in fig. 1. and its most natural situation is below, as in this figure.

The art of perspective is conveniently divided into *ICHOGRAPHY*, which teaches how to make a perspective draught of figures on a plane, commonly called the ground-plan; and *SCENOGRAPHY*, which teaches how to draw solid figures, or such figures as are raised above this plan.

Fundamental PROB. I. To put into perspective any given point of the ground plan.

First general construction.

Plate From B and P (fig. 2.) draw any two parallel lines
SCCLXXXIII. BA, PV, cutting the ground-line and horizon-line in A and V, and draw BP, AV, cutting each other in *b*; *b* is the picture of B.

For it is evident that BA, PV, of this figure are analogous to BA and EV of fig. 1. and that $BA : PV = bA : bV$.

If BA' be drawn perpendicular to GL, PV will fall on PS, and need not be drawn. AV will be A'S. — This is the most easy construction, and is nearly the same with Ferguson's.

Second general construction.

Draw two lines BA, BA", and two lines PV, PD, parallel to them, and draw AV, A"D, cutting each other in *b*; *b* is the picture of B by Cor. 2. — This construction is the foundation of all the rules of perspective that are to be found in the books on this subject. They appear in a variety of forms, owing to the ignorance or inattention of the authors to the principles. The rule most generally adhered to is as follows:

Draw BA (fig. 3.) perpendicular to the ground-line, and AS to the point of sight, and set off A β equal to BA. Set off SD equal to the distance of the eye in the opposite direction from S that β is from A, where B and E of fig. 1. are on opposite sides of the picture; otherwise set them the same way. D is called the point of distance. Draw β D, cutting AS in B. This is evidently equivalent to drawing BA and PS perpendicular to the ground-line and horizon-line, and B β and PD making an angle of 45° with these lines, with the additional puzzle about the way of setting off A β and SD, which is avoided in the construction here given.

This usual construction, however, by a perpendicular and the point of distance, is extremely simple and convenient; and two points of distance, one on each side of S, serve for all points of the ground plan. But the first general construction requires still fewer lines,

if BA be drawn perpendicular to GL, because PV will then coincide with PS.

Third general construction.

Draw BA from the given point B perpendicular to the ground-line, and AS to the point of sight. From the point of distance D set off D*d* equal to BA, on the same or the contrary side as S, according as B is on the same or the contrary side of the picture as the eye. Join *d*, A, and draw Db parallel to dA. *b* is the picture of B. For SD, D*d*, are equal to the distances of the eye and given point from the picture, and $SD : Dd = bS : bA$.

This construction does not naturally arise from the original lines, but is a geometrical consequence from their position and magnitude; and it is of all others the most generally convenient, as the perpendicular distances of any number of points may be arranged along SD without confusion, and their direct situations transferred to the ground line by perpendiculars such as BA; and nothing is easier than drawing parallels, either by a parallel ruler or a bevel-square, used by all who practise drawing.

PROB. 2. To put any straight line BC (fig. 4.) of the ground plan in perspective.

Find the pictures *b*, *c*, of its extreme points by any of the foregoing constructions, and join them by the straight line *bc*.

Perhaps the following construction will be found very generally convenient.

Produce CB till it meet the ground-line in A, and draw PV parallel to it, and AV, and PB, PC, cutting AV in *b*, *c*. V is its vanishing point, by Cor. 3. of the fundamental theorem.

It must be left to the experience and sagacity of the drawer to select such constructions as are most suitable to the multiplicity of the figures to be drawn.

PROB. 3. To put any rectilinear figure of the ground-plan in perspective.

Put the bounding lines in perspective, and the problem is solved.

The variety of constructions of this problem is very great, and it would fill a volume to give them all. The most generally convenient is to find the vanishing points of the bounding lines, and connect these with the points of their intersection with the ground-line. For example, to put the square ABCD (fig. 5.) into perspective.

Draw from the projecting point PV, PW, parallel to AB, BC, and let AB, BC, CD, DA, meet the ground-line in α , α , β , δ , and draw α V, δ V, α W, β W, cutting each other in *a b c d*, the picture of the square ABCD. The demonstration is evident.

This construction, however, runs the figure to great distances on each side of the middle line when any of the lines of the original figure are nearly parallel to the ground-line.

The following construction (fig. 6.) avoids this inconvenience.

Let D be the point of distance. Draw the perpendiculars A α , B β , C γ , D δ , and the lines A ϵ , B ζ , C η , D θ , parallel to PD. Draw S α , S β , S γ , S δ , and D ϵ , D ζ , D η , D θ , cutting the former in *a*, *b*, *c*, *d*, the angles of the picture.

It is not necessary that D be the point of distance, only the lines A ϵ , B ζ , &c. must be parallel to PD.

Remarks.

Remark. In all the foregoing constructions the necessary lines (and even the finished picture) are frequently confounded with the original figure. To avoid this great inconvenience, the writers on perspective direct us to transpose the figure; that is, to transfer it to the other side of the ground line, by producing the perpendiculars $A\alpha$, $B\beta$, $C\gamma$, $D\delta$, till $\alpha A'$, $\beta B'$, &c. are respectively equal to $A\alpha$, $B\beta$, &c.; or, instead of the original figure, to use only its transposed substitute $A'B'C'D'$. This is an extremely proper method. But in this case the point P must also be transposed to P' above S , in order to retain the first or most natural and simple construction, as in fig. 7.; where it is evident, that when $BA = AB'$, and $SP = SP'$, and $B'P'$ is drawn, cutting AS in b , we have $bA : bS = BA : PS = BA : PS$, and b is the picture of B : whence follows the truth of all the subsequent constructions with the transposed figure.

Plate
CCCLXXXII.

PROB. 4. *To put any curvilinear figure to the ground-plan into perspective.*

Put a sufficient number of its points in perspective by the foregoing rules, and draw a curve line through them.

It is well known that the conic sections and some other curves, when viewed obliquely, are conic sections or curves of the same kinds with the originals, with different positions and proportions of their principal lines, and rules may be given for describing their pictures founded on this property. But these rules are very various, unconnected with the general theory of perspective, and more tedious in the execution, without being more accurate than the general rule now given. It would be a useless affectation to insert them in this elementary treatise.

We come in the next place to the delineation of figures not in a horizontal plane, and of solid figures. For this purpose it is necessary to demonstrate the following

THEOREM II.

The length of any vertical line standing on the ground plane is to that of its picture as the height of the eye to the distance of the horizon line from the picture of its foot.

Let BC be the vertical line standing on B , and let EF be a vertical line through the eye. Make BD equal to EF , and draw DE , CE , BE . It is evident that DE will cut the horizon line in some point d , CE will cut the picture plane in c , and BE will cut it in b , and that bc will be the picture of BC , and is vertical, and that BC is to bc as BD to bd , or as EF to bd .

Cor. The picture of a vertical line is divided in the same ratio as the line itself. For $BC : BM = bc : bm$.

PROB. 5. *To put a vertical line of a given length in perspective standing on a given point of the picture.*

Through the given point b (Fig. 8.) of the picture, draw SbA from the point of sight, and draw the vertical line AD , and make AE equal to the length or height of the given line. Join ES , and draw bc parallel to AD , producing bc , when necessary, till it cut the horizontal line in d , and we have $bc : bd = AD : AE$, that is, as the length of the given line to

the height of the eye, and bd is the distance of the horizon-line from the point b , which is the picture of the foot of the line. Therefore (Theor. 2.) bc is the required picture of the vertical line.

This problem occurs frequently in views of architecture; and a compendious method of solving it would be peculiarly convenient. For this purpose, draw a vertical line XZ at the margin of the picture, or on a separate paper, and through any point V of the horizon-line draw VX . Set off XY , the height of the vertical line, and draw VY . Then from any points b, r , on which it is required to have the pictures of lines equal to XY , draw bS, rS , parallel to the horizon line, and draw the verticals Su, tv : these have the lengths required, which may be transferred to b and r . This, with the third general construction for the base points, will save all the confusion of lines which would arise from constructing each line apart.

PROB. 6. *To put any sloping line in perspective.*

From the extremities of this line, suppose perpendiculars making the ground plane in two points, which we shall call the base points of the sloping line. Put these base points in perspective, and draw, by last problem, the perpendiculars from the extremities. Join these by a straight line. It will be the picture required.

PROB. 7. *To put a square in perspective, as seen by a person not standing right against the middle of either of its sides, but rather nearly even with one of its corners.*

In fig. 9. let $ABCD$ be a true square, viewed by an observer, not standing at o , directly against the middle of its side AD , but at O almost even with its corner D , and viewing the side AD under the angle AOD ; the angle AoD (under which he would have seen AD from o) being 60 degrees.

Make AD in fig. 10. equal to AD in fig. 9. and draw SP and OO parallel to AD . Then, in fig. 10. let O be the place of the observer's eye, and SO be perpendicular to SP ; then S shall be the point of sight in the horizon SP .

Take SO in your compasses, and set that extent from S to P : then P shall be the true point of distance, taken according to the foregoing rules.

From A and D draw the straight lines AS and DS ; draw also the straight line AP , intersecting DS in C .

Lastly, to the point of intersection C draw BC parallel to AD ; and $ABCD$ in fig. 10. will be a true perspective representation of the square $ABCD$ in fig. 9. The point M is the centre of each square, and AMC and BMD are the diagonals.

PROB. 8. *To put a reticulated square in perspective, as seen by a person standing opposite to the middle of one of its sides.*

A reticulated square is one that is divided into several little squares, like net-work, as fig. 11. each side of which is divided into four equal parts, and the whole surface into four times four (or 16) equal squares.

Having divided this square into the given number of lesser squares, draw the two diagonals AC and BD .

Make AD in fig. 12. equal to AD in fig. 11. and divide it into four equal parts, as Ae, eg, gi , and iD .

Draw SP for the horizon, parallel to AD , and, through

through the middle point g of AD , draw OS perpendicular to AD and SP .—Make S the point of sight, and O the place of the observer's eye.

Take SP equal to SO , and P shall be the true point of distance.—Draw AS and DS to the point of sight, and AP to the point of distance, intersecting DS in C : then draw BC parallel to AD , and the outlines of the reticulated square $ABCD$ will be finished.

From the division-points e, g, i , draw the straight lines ef, gb, ik , tending towards the point of sight S ; and draw BD for one of the diagonals of the square, the other diagonal AC being already drawn.

Through the points r and s , where these diagonals cut ef and ik , draw lm parallel to AD . Through the centre-point x , where the diagonals cut gb , draw no parallel to AD .—Lastly, through the points v and w , where the diagonals cut cf and ik , draw pq parallel to AD ; and the reticulated perspective square will be finished.

Plate CCCLXXXIII. This square is truly represented, as if seen by an observer standing at O , and having his eye above the horizontal plane $ABCD$ on which it is drawn; as if OS was the height of his eye above that plane: and the lines which form the small squares within it have the same letters of reference with those in fig. 11. which is drawn as it would appear to an eye placed perpendicularly above its centre x .

PROB. 9. *To put a circle in perspective.*

If a circle be viewed by an eye placed directly over its centre, it appears perfectly round, but if it be obliquely viewed, it appears of an elliptical shape. This is plain by looking at a common wine-glass set upright on a table.

Make a true reticulated square, as fig. 11. Plate CCCLXXXIII. of the same diameter as you would have the circle; and setting one foot of your compasses in the centre x , describe as large a circle as the sides of the square will contain. Then, having put this reticulated square into perspective, as in fig. 12. observe through what points of the cross lines and diagonals of fig. 11. the circle passes; and through the like points in fig. 12. draw the ellipsis, which will be as true a perspective representation of the circle, as the square in fig. 12. is of the square in fig. 11.

This is Mr Ferguson's rule for putting a circle in perspective; but the following rules by *Wolf* are perhaps more universal.

If the circle to be put in perspective be small, describe a square about it. Draw first the diagonals of the square, and then the diameters ba and de (fig. 1. Plate CCCLXXXIV.) cutting one another at right angles; draw the straight lines fg and bc parallel to the diameter de . Through b and f and likewise c and g draw straight lines meeting DE , the ground line of the picture in the points 3 and 4. To the principal point V draw the straight lines 1 V , 3 V , 4 V , 2 V , and to the points of distance L and K , 2 L and 1 K . Lastly, join the points of intersection a, b, d, f, b, g, e, c , by the arcs ab, bd, df , and $abdfbgeca$ will be the circle in perspective.

If the circle be large so as to make the foregoing practice inconvenient, bisect the ground line AB , describing, from the point of bisection as a centre, the semicircle AGB (fig. 2. Plate CCCLXXXIV.), and from any number of points in the circumference C, F, G, H, I , &c. draw to the ground line the perpendi-

culars $C1, F2, G3, H4, I5$, &c.: From the points $A, 1, 2, 3, 4, 5, B$, draw straight lines to the principal point or point of sight V , likewise straight lines from B and A to the points of distance L and K . Through the common intersections draw straight lines as in the preceding case; and you will have the points a, c, f, g, b, i, b , representatives of A, C, F, G, H, I, B . Then join the points a, c, f , &c. as formerly directed, and you have the perspective circle $acfgbibibgfc$.

Hence it is apparent how we may put not only a circle but also a pavement laid with stones of any form in perspective. It is likewise apparent how useful the square is in perspective; for, as in the second case, a true square was described round the circle to be put in perspective, and divided into several smaller squares, so in this third case we make use of the semicircle only for the sake of brevity instead of that square and circle.

PROB. 10. *To put a reticulated square in perspective, as seen by a person not standing right against the middle of either of its sides, but rather nearly even with one of its corners.*

In fig. 13. Plate CCCLXXXIII, let O be the place of an observer, viewing the square $ABCD$ almost even with its corner D .—Draw at pleasure SP for the horizon, parallel to AD , and make SO perpendicular to SP : then S shall be the point of sight, and P the true point of distance, if SP be made equal to SO .

Draw AS and DS to the point of sight, and AP to the point of distance, intersecting DS in the point C ; then draw BC parallel to AD , and the outlines of the perspective square will be finished. This done, draw the lines which form the lesser squares, as taught in Prob. 8. and the work will be completed.—You may put a perspective circle in this square by the same rule as it was done in fig. 12.

PROB. 14. *To put a cube in perspective, as if viewed by a person standing almost even with one of its edges, and seeing three of its sides.*

In fig. 16. Plate CCCLXXXIII. let AB be the breadth of either of the six equal square sides of the cube AG ; O the place of the observer, almost even with the edge CD of the cube, S the point of sight, SP the horizon parallel to AD , and P the point of distance taken as before.

Make $ABCD$ a true square; draw BS and CS to the point of sight, and BP to the point of distance, intersecting CS in G .—Then draw FG parallel to BC , and the uppermost perspective square side $BFGC$ of the cube will be finished.

Draw DS to the point of sight, and AP to the point of distance, intersecting DS in the point I : then draw GI parallel to CD ; and, if the cube be an opaque one, as of wood or metal, all the outlines of it will be finished; and then it may be shaded as in the figure.

But if you want a perspective view of a transparent glass cube, all the sides of which will be seen, draw AH toward the point of sight, FH parallel to BA , and HI parallel to AD : then $AHID$ will be the square base of the cube, perspective parallel to the top $BFGC$; $ABFH$ will be the square side of the cube, parallel to $CGID$, and $FGIH$ will be the square side parallel to $ABCD$.

As to the shading part of the work, it is such mere children's play, in comparison of drawing the lines

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which form the shape of any object, that no rules need be given for it. Let a person sit with his left side toward a window, and he knows full well, that if any solid body be placed on a table before him, the light will fall on the left-hand side of the body, and the right-hand side will be in the shade.

PROB. 15. *To put any solid in perspective.*

Put the base of the solid, whatever it be, in perspective by the preceding rules. From each bounding point of the base, raise lines representing in perspective the altitude of the object; by joining these lines and shading the figure according to the directions in the preceding problem, you will have a scenographic representation of the object. This rule is general; but as its application to particular cases may not be apparent, it will be proper to give the following example of it.

PROB. 16. *To put a cube in perspective as seen from one of its angles.*

Since the base of a cube standing on a geometrical plane, and seen from one of its angles, is a square seen from one of its angles, draw first such a perspective square: then raise from any point of the ground-line DE (Fig. 3. Plate CCCLXXXIV.) the perpendicular HI equal to the side of the square, and draw to any point V in the horizontal line HR the straight lines VI and VH. From the angles db and c draw the dotted lines $d2$ and $c1$ parallel to the ground line DE. Perpendicular to those dotted lines, and from the points 1 and 2, draw the straight lines L1 and M2. Lastly, since HI is the altitude of the intended cube in a , L1 in c and b , M2 in d , draw from the point a the straight line fa perpendicular to aE , and from the points b and c , bg and ce , perpendicular to $bc1$, and $abdc$ being according to rule, make $af=HI$, $bg=ec=L1$, and $bd=M2$. Then, if the points g, b, e, f , be joined, the whole cube will be in perspective.

PROB. 17. *To put a square pyramid in perspective, as standing upright on its base, and viewed obliquely.*

In fig. 4. n° 1. of Plate CCCLXXXIV. let AD be the breadth of either of the four sides of the pyramid ATCD at its base ABCD; and MT its perpendicular height. Let O be the place of the observer, S his point of sight, SE his horizon, parallel to AD and perpendicular to OS; and let the proper point of distance be taken in SE produced toward the left hand, as far from S as O is from S.

Draw AS and DS to the point of sight, and DL to the point of distance, intersecting AS in the point B. Then, from B, draw BC parallel to AD; and ABCD shall be the perspective square base of the pyramid.

Draw the diagonal AC, intersecting the other diagonal BD at M, and this point of intersection shall be the centre of the square base.

Draw MT perpendicular to AD, and of a length equal to the intended height of the pyramid: then draw the straight outlines AT, CT, and DT; and the outlines of the pyramid (as viewed from O) will be finished; which being done, the whole may be so shaded as to give it the appearance of a solid body.

If the observer had stood at o , he could have only seen the side ATD of the pyramid; and two is the greatest number of sides that he could see from any other place of the ground. But if he were at any height above the pyramid, and had his eye directly

over its top, it would then appear as in N° 2. and he would see all its four sides E, F, G, H, with its top t just over the centre of its square base ABCD; which would be a true geometrical and not a perspective square.

PROB. 18. *To put two equal squares in perspective, one of which shall be directly over the other, at any given distance from it, and both of them parallel to the plane of the horizon.*

In fig. 5. Plate CCCLXXXIV. let ABCD be a perspective square on a horizontal plane, drawn according to the foregoing rules, S being the point of sight, SP the horizon (parallel to AD), and P the point of distance.

Suppose AD, the breadth of this square, to be three feet; and that it is required to place just such another square EFGH directly above it, parallel to it and two feet from it.

Make AE and DH perpendicular to AD, and two thirds of its length: draw EH, which will be equal and parallel to AD; then draw ES and HS to the point of sight S, and EP to the point of distance P, intersecting HS in the point G: this done, draw FG parallel to EH; and you will have two perspective squares ABCD and EFGH, equal and parallel to one another, the latter directly above the former, and two feet distant from it; as was required.

By this method shelves may be drawn parallel to one another, at any distance from each other in proportion to their length.

PROB. 19. *To put a truncated pyramid in perspective.*

Let the pyramid to be put in perspective be quin-quangular. If from each angle of the surface whence the top is cut off, a perpendicular be supposed to fall upon the base, these perpendiculars will mark the bounding points of a pentagon, of which the sides will be parallel to the sides of the base of the pyramid within which it is inscribed. Join these points, and the interior pentagon will be formed with its longest side parallel to the longest side of the base of the pyramid. From the ground-line EH (Fig. 6. Plate CCCLXXXIV.) raise the perpendicular IH, and make it equal to the altitude of the intended pyramid. To any point V draw the straight lines IV and HV, and by a process similar to that in Problem 16. determine the scenographical altitudes a, b, c, d, e . Connect the upper points f, g, h, i, k , by straight lines; and draw lk, fm, gn , and the perspective of the truncated pyramid will be completed.

Cor. If in a geometrical plane two concentric circles be described, a truncated cone may be put in perspective in the same manner as a truncated pyramid.

PROB. 20. *To put in perspective a hollow prism lying on one of its sides.*

Let ABDEC (fig. 7. n° 1.) be a section of such a prism. Draw HI parallel to AB, and distant from it the breadth of the side on which the prism rests; and from each angle internal and external of the prism let fall perpendiculars to HI. The parallelogram will be thus divided by the ichnographical process below the ground-line, so as that the side AB of the real prism will be parallel to the corresponding side of the scenographic view of it.—To determine the altitude of the internal and external angles. From H (n° 2.) raise HI perpendicular to the ground-line, and on it

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mark off the true altitudes H_1, H_2, H_3, H_4 , and H_5 . Then if from any point V in the horizon be drawn the straight lines $VH, V_1, V_2, V_3, V_4, V_5$ or VI ; by a process similar to that of the preceding problem, will be determined the height of the internal angles, viz. $1=aa, 2=bb, 4=dd$; and of the external angles, $3=cc$, and $5=ee$; and when these angles are formed and put in their proper places, the scenograph of the prism is complete.

PROB. 21. *To put a square table in perspective, standing on four upright square legs of any given length with respect to the breadth of the table*

In fig. 5. Plate CCCLXXXIV. let $ABCD$ be the square part of the floor on which the table is to stand, and $EFGH$ the surface of the square table, parallel to the floor.

Suppose the table to be three feet in breadth, and its height from the floor to be two feet; then two thirds of AD or EH will be the length of the legs i and k ; the other two (l and m) being of the same length in perspective.

Having drawn the two equal and parallel squares $ABCD$ and $EFGH$, as shown in Prob. 10. let the legs be square in form, and fixed into the table at a distance from its edges equal to their thickness. Take Aa and Dd equal to the intended thickness of the legs, and ab and dc also equal thereto. Draw the diagonals AC and BD , and draw straight lines from the points a, b, c, d , towards the points of sight S , and terminating at the side BC . Then, through the points where these lines cut the diagonals, draw the straight lines n and o, p and q , parallel to AD ; and you will have formed four perspective squares (like $ABCD$ in fig. 4. n^o 1.) for the bases of the four legs of the table: and then it is easy to draw the four upright legs by parallel lines, all perpendicular to AD ; and to shade them as in the figure.

To represent the intended thickness of the table-board, draw eb parallel to EH , and HG toward the point of sight S ; then shade the spaces between these lines, and the perspective figure of the table will be finished.

PROB. 22. *To put five square pyramids in perspective, standing upright on a square pavement composed of the surfaces of 81 cubes.*

In fig. 8. Plate CCCLXXXIV. let $ABCD$ be a perspective square drawn according to the foregoing rules; S the point of sight, P the point of distance in the horizon PS , and AC and BD the two diagonals of the square.

Divide the side AD into 9 equal parts (because 9 times 9 is 81) as Aa, ab, bc , &c. and from these points of division, a, b, c, d , &c. draw lines toward the point of sight S , terminating at the furthestmost side BC of the square. Then, through the points where these lines cut the diagonals, draw straight lines parallel to AD , and the perspective square $ABCD$ will be subdivided into 81 lesser squares, representing the upper surfaces of 81 cubes, laid close to one another's sides in a square form.

Draw AK and DL , each equal to Aa , and perpendicular to AD ; and draw LN toward the point of sight S : then draw KL parallel to AD , and its distance from AD will be equal to Aa .—This done, draw $al, bm, cn, do, ep, fq, gr$, and bs , all paral-

lel to AK ; and the space $ADLK$ will be subdivided into nine equal squares, which are the outer upright surfaces of the nine cubes in the side AD of the square $ABCD$.

Draw LN toward the point of sight S ; and from the points where the lines, which are parallel to AD in this square, meet the side CD thereof, draw short lines to LN , all parallel to DL , and they will divide that side into the outer upright surfaces of the nine cubes which compose it: and then the outsides of all the cubes that can be visible to an observer, placed at a proper distance from the corner D of the square, will be finished.

As taught in Prob. 17. place the pyramid AE upright on its square base $Atva$, making it as high as you please; and the pyramid DH on its square base $buwD$, of equal height with AE .

Draw EH from the top of one of these pyramids to the top of the other; and EH will be parallel to AD .

Draw ES and HS to the point of sight S , and HP to the point of distance P , intersecting ES in F .

From the point F , draw FG parallel to EH ; then draw EG , and you will have a perspective square $EFGH$ (parallel to $ABCD$) with its two diagonals EG and FH , intersecting one another in the centre of the square at I . The four corners of this square, E, F, G, H , give the perspective heights of the four pyramids AE, BF, CG , and DH ; and the intersection I of the diagonals gives the height of the pyramid MI , the centre of whose base is the centre of the perspective square $ABCD$.

Lastly, place the three pyramids BF, CG, MI , upright on their respective bases at B, C , and M ; and the required perspective representation will be finished, as in the figure.

PROB. 23. *To put upright pyramids in perspective, on the sides of an oblong square or parallelogram; so that their distances from one another shall be equal to the breadth of the parallelogram.*

In most of the foregoing operations we have considered the observer to be so placed, as to have an oblique view of the perspective objects: in this, we shall suppose him to have a direct view of fig. 8. Plate CCCLXXXIV. that is, standing right against the middle of the end AD which is nearest to his eye, and viewing AD under an angle of 60 degrees.

Having cut AD in the middle, by the perpendicular line Ss , take S therein at pleasure for the point of sight, and draw ES for the horizon, parallel to AD .—Here Ss must be supposed to be produced downward, below the limits of the plate, to the place of the observer; and SE to be produced towards the left hand beyond E , far enough to take a proper point of distance therein, according to the foregoing rules.

Take Ad at pleasure, and Dg equal to Ad , for the breadths of the square bases of the two pyramids AE and DF next the eye: then draw AS and dS , and likewise DS and gS , to the point of sight S ; and DG on to the point of distance, intersecting AS in G : then, from G draw GI parallel to AD , and you will have the first perspective square $AGID$ of the parallelogram $ABCD$.

From I draw IH to (or toward) the point of distance, intersecting AS in H : then, from H draw

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HK parallel to AD, and you will have the second perspective square GHKI of the parallelogram.—Go on in this manner till you have drawn as many perspective squares up toward S as you please.

Through the point *e*, where DG intersects *gS*, draw *bf* parallel to AD; and you will have formed the two perspective square bases *A b c d* and *e f D g* of the two pyramids at A and D.

From the point *f* (the upper outward corner of *efDg*) draw *fb* toward the point of distance, till it meets AS in *b*; then, from this point of meeting, draw *bm* parallel to GI, and you will have formed the two perspective squares *G b i k* and *l m I n*, for the square bases of the two pyramids at G and I.

Proceed in the same manner to find the bases of all the other pyramids, at the corners of the rest of the perspective squares in the parallelogram ABCD, as shown by the figure.—Then,

Having placed the first two pyramids at A and D upright on their square bases, as shown in Prob 9. and made them of any equal heights at pleasure, draw ES and FS from the tops of these pyramids to the point of sight S: place all the rest of the pyramids upright on their respective bases, making their tops touch the straight lines ES and FS; and all the work, except the shading part, will be finished.

PROB. 24. *To put a square pyramid of equal-sized cubes in perspective.*

Fig. 2. Plate CCCLXXXV. represents a pyramid of this kind; consisting as it were of square tables of cubes, one table above another; 81 in the lowest, 49 in the next, 25 in the third, 9 in the fourth, and 1 in the fifth or uppermost. These are the square numbers of 9, 7, 5, 3, and 1.

If the artist is already master of all the preceding operations, he will find less difficulty in this than in attending to the following description of it: for it cannot be described in a few words, but may be executed in a very short time.

In fig. 1. having drawn PS for the horizon, and taken S for the point of sight therein (the observer being at O) draw AD parallel to PS for the side (next the eye) of the first or lowermost table of cubes. Draw AS and DS to the point of sight S, and DP to the point of distance P, intersecting AS in the point B. Then, from B, draw BC parallel to AD, and you will have the surface ABCD of the first table.

Divide AD into nine equal parts, as *A a, a b, b c, c d, &c.* then make AK and DL equal to *A a*, and perpendicular to AD. Draw KL parallel to AD, and from the points of equal division at *a, b, c, &c.* draw lines to KL, all parallel to AK. Then draw *bS* to the point of sight S, and from the division-points *a, b, c, &c.* draw lines with a black lead pencil, all tending towards the point of sight, till they meet the diagonal BD of the square.

From these points of meeting draw black lead lines to DC, all parallel to AD; then draw the parts of these lines with black ink which are marked 1, 2, 3, 4, &c. between *bE* and DC.

Having drawn the first of these lines *β q* with black ink, draw the parts *a i, b k, c l, &c.* (of the former lines which met the diagonal BD) with black ink also; and rub out the rest of the black lead lines, which would otherwise confuse the following part of the

work. Then, draw LF toward the point of sight S; and, from the points where the lines 1, 2, 3, 4, &c. meet the line DC, draw lines down to LF, all parallel to DL; and all the visible lines between the cubes in the first table will be finished.

Make *iG* equal and perpendicular to *β i*, and *qM* equal and parallel to *iG*; then draw GM, which will be equal and parallel to *i q*. From the points *kl, mn, &c.* draw *kn, lo, mp, &c.* all parallel to *iG*, and the outfiles of the seven cubes in the side Gq of the second table will be finished.

Draw GS and MS to the point of sight S, and MP to the point of distance P, intersecting GS in H; then, from the point of intersection H, draw HI parallel to AD; and you will have the surface GHIM of the second table of cubes.

From the points *n, o, p, q, &c.* draw black lead lines toward the point of sight S, till they meet the diagonal MH of the perspective square surface GHIM; and draw *SM*, with black ink, toward the point of sight.

From those points where the lines drawn from *n, o, p, q, &c.* meet the diagonal MH, draw black lead lines to MI, all parallel to AD; only draw the whole first line *γ 1* with black ink, and the parts 2, 3, 4, &c. and *nt, ou, pv, &c.* of the other lines between *γ N* and MI, and GM and *γ 1*, with the same; and rub out all the rest of the black lead lines, to avoid further confusion. Then, from the points where the short lines 1, 2, 3, &c. meet the line MI, draw lines down to *qE*, all parallel to *M q*, and the outer surfaces of the seven cubes in the side ME will be finished; and all these last lines will meet the former parallels 2, 3, 4, &c. in the line *qE*.

Make *tO* equal and perpendicular to *γ t*, and *yP* equal and parallel to *tO*; then draw OP, which will be equal and parallel to *t y*.—This done, draw OS and PS to the point of sight S, and PP to the point of distance P in the horizon. Lastly, from the point Q, where PP intersects OS, draw QR parallel to OP; and you will have the outlines OQRP of the surface of the third perspective table of cubes.

From the points *u, v, w, x* draw upright lines to OP, all parallel to *tO*, and you will have the outer surfaces of the five cubes in the side Oy of this third table.

From the points where these upright lines meet OP, draw lines toward the point of sight S, till they meet the diagonal PQ; and from these points of meeting draw lines to PR, all parallel to OP, making the parts 2, 3, 4, 5, of these lines with black ink which lie between ZY and PR. Then, from the points where these lines meet PR, draw lines down to *γ N*; which will bound the outer surfaces of the five cubes in the side PN of the third table.

Draw the line *δ 1* with black ink; and, at a fourth part of its length between *δ* and Z, draw an upright line to S, equal in length to that fourth part, and another equal and parallel thereto from Z to V: then draw SV parallel to *δ Z*, and draw the two upright and equidistant lines between *δ Z* and SV, and you will have the outer surfaces of the three cubes in the side SZ of the fourth table.

Draw SS and VS to the point of sight S in the horizon, and VP to the point of distance therein, intersecting

perfecting SS in T; then draw TU parallel to SV, and you have STUV, the surface of the fourth table; which being reticulated or divided into 9 perspective small squares, and the uppermost cube W placed on the middlemost of the squares, all the outlines will be finished; and when the whole is properly shaded, as in fig. 2. the work will be done.

PROB. 25. *To represent a double cross in perspective.*

In fig. 3. Plate CCCLXXXV. let ABCD and EFGH be two perspective squares, equal and parallel to one another, the uppermost directly above the lowermost, drawn by the rules already laid down, and as far asunder as is equal to the given height of the upright part of the cross; S being the point of sight, and P the point of distance, in the horizon PS taken parallel to AD.

Draw AE, DH, and CG; then AEHD and DHGC shall be the two visible sides of the upright part of the cross; of which, the length AE is here made equal to three times the breadth EH.

Divide DH into three equal parts, HI, IK, and KD. Through these points of division, at I and K, draw MO and PK parallel to AD; and make the parts MN, IO, PQ, KR, each equal to HI: then draw MP and OR parallel to DH.

From M and O, draw MS and OS to the point of sight S; and from the point of distance P draw PN cutting MS in T: from T draw TU parallel to MO, and meeting OS in U; and you will have the uppermost surface MTUO of one of the cross pieces of the figure. — From R, draw RS to the point of sight S; and from U draw UV parallel to OR; and OUVR shall be the perspective square end next the eye of that cross-part.

Draw PM (as long as you please) from the point of distance P, through the corner M; lay a ruler to N and S, and draw XN from the line P: — then lay the ruler to I and S, and draw YZS. — Draw XY parallel to MO, and make XW and YB equal and perpendicular to XY: then draw WB parallel to XY, and WXYB shall be the square visible end of the other cross-part of the figure.

Draw BK toward the point of sight S; and from U draw UP to the point of distance P, intersecting YS in Z: then, from the intersection Z, draw Za parallel to MO, and Zb parallel to HD, and the whole delineation will be finished.

This done, shade the whole, as in fig. 4. and you will have a true perspective representation of a double cross.

PROB. 26. *To put three rows of upright square objects in perspective, equal in size, and at equal distances from each other, on an oblong square plane, the breadth of which shall be of any assigned proportion to the length thereof.*

Fig. 5. Plate CCCLXXXV. is a perspective representation of an oblong square plane, three times as long as it is broad, having a row of nine upright square objects on each side, and one of the same number in the middle; all equally high, and at equal distances from one another, both long-wise and cross-wise, on the same plane.

In fig. 6. PS is the horizon, S the point of sight, P the point of distance, and AD (parallel to PS) the breadth of the plane.

Draw AS, NS, and DS, to the point of sight S; the point N being in the middle of the line AD:

and draw DP to the point of distance P, intersecting AS in the point B: then, from B draw BC parallel to AD, and you have the perspective square ABCD.

Through the point i, where DB intersects NS, draw ae parallel to AD; and you will have subdivided the perspective square ABCD into four lesser squares, as AaiN, NieD, aBki, and ikCe.

From the point C (at the top of the perspective square ABCD) draw CP to the point of distance P, intersecting AS in E; then, from the point E draw EF parallel to AD; and you will have the second perspective square BEFC.

Through the point l, where CE intersects NS, draw bf parallel to AD; and you will have subdivided the square BEFC into the four squares Bbik, klfC, bEml, and lmFf.

From the point F (at the top of the perspective square BEFC) draw FP to the point of distance P, intersecting AS in I; then from the point I draw IK parallel to AD; and you will have the third perspective square EIKF.

Through the point n, where FI intersects NS, draw cg parallel to AD; and you will have subdivided the square EIKF into four lesser squares, Ecnm, mngF, cIon, and noKg.

From the point K (at the top of the third perspective square EIKF) draw KP to the point of distance P, intersecting AS in L; then from the point L draw LM parallel to AD; and you will have the fourth perspective square ILMK.

Through the point p, where KL intersects NS, draw db parallel to AD; and you will have subdivided the square ILMK into the four lesser squares Idpo, opbK, dLqp, and pqMb.

Thus we have formed an oblong square ALMD, whose perspective length is equal to four times its breadth, and it contains 16 equal perspective squares. — If greater length was still wanted, we might proceed further on toward S.

Take A 3, equal to the intended breadth of the side of the upright square object AQ (all the other sides being of the same breadth), and AO for the intended height. Draw O 18 parallel to AD, and make D 8 and 4 7 equal to A 3; then draw 3 S, 4 S, 7 S, and 8 S to the point of sight S; and among them we shall have the perspective square bases of all the 27 upright objects on the plane.

Through the point q, where DB intersects 8 S, draw i 10 parallel to AD, and you have the three perspective square bases A i 2 3, 4 5 6 7, 8 9 10 D, of the three upright square objects at A, N, and D.

Through the point 21, where eb intersects 8 S, draw 14, 11 parallel to AD; and you will have the three perspective squares a 14 15 16 17 18 19 20, and 21 11 e 22, for the bases of the second cross row of objects; namely, the next beyond the first three at A, N, and D.

Through the point w, where CE intersects 8 S, draw a line parallel to BC; and you will have three perspective squares, at B, k, and C, for the bases of the third row of objects; one of which is set up at B.

Through the point x, where fc intersects 8 S, draw a line parallel to bf; and you will have three perspective squares, at b, l, and x, for the bases of the fourth cross row of objects.

Go on in this manner, as you see in the figure, to find

find the rest of the square bases, up to LM; and you will have 27 upon the whole oblong square plane, on which you are to place the like number of objects, as in fig. 5.

Plate CCCLXXXV. Having assumed AO for the perspective height of the three objects at A, N, and D (fig. 6.) next the observer's eye, and drawn O 18 parallel to AD, in order to make the objects at N and D of the same height as that at O; and having drawn the upright lines 4 15, 7 W, 8 X, and D 22, for the heights N and D; draw OS and RS, 15 S and WS, XS and 22 S, all to the point of sight S: and these lines will determine the perspective equal heights of all the rest of the upright objects, as shown by the two placed at a and B.

To draw the square tops of these objects, equal and parallel to their bases, we need only give one example, which will serve for all.

Draw 3 R and 2 Q parallel to AO, and up to the line RS; then draw PQ parallel to OR, and OPQR shall be the top of the object at A, equal and parallel to its square base A 1 2 3.—In the same easy way the tops of all the other objects are formed.

When all the rest of the objects are delineated, shade them properly, and the whole perspective scheme will have the appearance of fig. 5.

PROB. 27. *To put a square box in perspective, containing a given number of lesser square boxes of a depth equal to their width.*

Let the given number of little square boxes or cells be 16, then 4 of them make the length of each side of the four outer sides *ab*, *bc*, *cd*, *da*, as in fig. 7. and the depth *af* is equal to the width *ae*. Whoever can draw the reticulated square, by the rules laid down towards the beginning of this article, will be at no loss about putting this perspective scheme in practice.

PROB. 28. *To put stairs with equal and parallel steps in perspective.*

In fig. 1. of Plate CCCLXXXVI. let *ab* be the given breadth of each step, and *ai* the height thereof. Make *bc*, *cd*, *de*, &c. each equal to *ab*; and draw all the upright lines *ai*, *bl*, *cn*, *dp*, &c. perpendicular to *ab* (to which the horizon *sS* is parallel); and from the points *i*, *l*, *n*, *p*, *r*, &c. draw the equidistant lines *iB*, *lC*, *nD*, &c. parallel to *ab*; these distances being equal to that of *iB* from *ab*.

Draw ∞i touching all the corner-points *l*, *n*, *p*, *r*, *t*, *v*; and draw 2 16 parallel to ∞i , as far from it as you want the length of the steps to be.

Toward the point of sight S draw the lines *a 1*, *i 2*, *k 3*, *l 4*, &c. and draw 16 15, 14 13, 12 11, 10 9, 8 7, 6 5, 4 3, and 2 1, all parallel to *Ab*, and meeting the lines *w 15*, *u 13*, *s 11*, &c. in the points 15, 13, 11, 9, 7, 5, 3, and 1: then from these points draw 15 14, 13 12, 11 10, 9 8, 7 6, 5 4, and 3 2, all parallel to *ba*; and the outlines of the steps will be finished. From the point 16 draw 16 A parallel to *ba*, and A ∞ 16 will be part of the flat at the top of the uppermost step. This done, shade the work as in fig. 2. and the whole will be finished.

PROB. 29. *To put stairs with flats and openings in perspective, standing on a horizontal pavement of squares.*

In fig. 3. of Plate CCCLXXXVI. having made S the point of sight, and drawn a reticulated pavement AB

with black lead lines, which may be rubbed out again; at any distance from the side AB of the pavement which is nearest to the eye, and at any point where you choose to begin the stair at that distance, as *a*, draw *Ga* parallel to BA, and take *ab* at pleasure for the height of each step.

Take *ab* in your compasses, and set that extent as many times upward from F to E as is equal to the first required number of steps O, N, M, L, K; and from these points of division in EF draw 1 *b*, 2 *d*, 3 *f*, 4 *b*, and E *k*, all equidistant from one another, and parallel to *Fa*: then draw the equidistant upright lines *ab*, *td*, *uf*, *vb*, *wk*, and *Im*, all perpendicular to *Fa*: then draw *mb*, touching the outer corners of these steps at *m*, *k*, *b*, *f*, *d*, and *b*; and draw *ns* parallel to *mb*, as far from it as you want the length of the steps K, L, M, N, O to be.

Towards the point of sight S draw *mn*, *l 5*, *k 6*, *bp*, *f q*, *dr*, and *bs*. Then (parallel to the bottom-line BA) through the points *n*, *o*, *p*, *q*, *r*, *s*, draw *n 8*; *5*, *14*; *6*, *15*; *7*, *16*; *1*, *17*; and *2 s*: which done, draw *n 5* and *o 6* parallel to *lm*, and the outlines of the steps K, L, M, N, O will be finished.

At equal distances with that between the lines marked 8 and 14, draw the parallel lines above marked 9 10 11 12 and 13; and draw perpendicular lines upwards from the points *n*, *o*, *p*, *q*, *r*, *s*, as in the figure.

Make *Hm* equal to the intended breadth of the flat above the square opening at the left hand, and draw *HW* toward the point of sight S, equal to the intended length of the flat; then draw *WP* parallel to *Hm*, and the outlines of the flat will be finished.

Take the width of the opening at pleasure, as from F to C, and draw *CD* equal and parallel to *FE*. Draw *GH* parallel to *CD*, and the short lines marked 33, 34, &c. just even with the parallel lines 1, 2, &c. From the points where these short lines meet *CD* draw lines toward the point of sight S till they meet *DE*; then find the points where the lines 38, 39, 40, &c. of the pavement meet *Cy*, draw upright lines parallel to *CD*; and the lines which form the opening will be finished.

The steps P, Q, R, S, T, and the flat U above the arch V, are done in the same manner with those in fig. 1. as taught in Prob. 28. and the equidistant parallel lines marked 18, 19, &c. are directly even with those on the left-hand side of the arch V, and the upright lines on the right-hand side are equidistant with those on the left.

From the points where the lines 18, 19, 20, &c. meet the right-hand side of the arch, draw lines toward the point of sight S; and from the points where the pavement lines 29, 30, 31, 32, meet the line drawn from A towards the point of sight, draw upright lines toward the top of the arch.

Having done the top of the arch, as in the figure, and the few steps to the right hand thereof, shade the whole as in fig. 4. and the work will be finished.

PROB. 30. *To put upright conical objects in perspective, as if standing on the sides of an oblong square, at distances from one another equal to the breadth of the oblong.*

In fig. 5. of Plate CCCLXXXVI. the bases of the upright cones are perspective circles inscribed in squares of the same diameter; and the cones are set upright on

on their bases by the same rules as are given for pyramids, which we need not repeat here.

In most of the foregoing operations we have considered the observer's eye to be above the level of the tops of all the objects, as if he viewed them when standing on high ground. In this figure, and the first and second of the next plate, we shall suppose him to be standing on low ground, and the tops of the objects to be above the level of his eye.

Plate
CCCLXXXVI. In fig. 5. let AD be the perspective breadth of the oblong square ABCD; and let Aa and Dd (equal to Aa) be taken for the diameters of the circular bases of the two cones next the eye, whose intended equal heights shall be AE and DF.

Having made S the point of sight in the horizon parallel to AD, and found the proper point of distance therein, draw AS and aS to contain the bases of the cones on the left-hand side, and DS and dS for those on the right.

Having made the two first cones at A and D of equal height at pleasure, draw ES and FS from their tops to the point of sight, for limiting the perspective heights of all the rest of the cones. Then divide the parallelogram ABCD into as many equal perspective squares as you please; find the bases of the cones at the corners of these squares, and make the cones thereon, as in the figure.

If you would represent a ceiling equal and parallel to ABCD, supported on the tops of these cones, draw EF, then EFGH shall be the ceiling; and by drawing ef parallel to EF, you will have the thickness of the floor-boards and beams, which may be what you please.

This shows how any number of equidistant pillars may be drawn of equal heights to support the ceiling of a long room, and how the walls of such a room may be represented in perspective at the backs of these pillars. It also shows how a street of houses may be drawn in perspective.

PROB. 31. *To put a square hollow in perspective, the depth of which shall bear any assigned proportion to its width.*

Fig. 1. of Plate CCCLXXXVII. is the representation of a square hollow, of which the depth AG is equal to three times its width AD; and S is the point of sight over which the observer's eye is supposed to be placed, looking perpendicularly down into it, but not directly over the middle.

Draw AS and DS to the point of sight S; make ST the horizon parallel to AD, and produce it to such a length beyond T that you may find a point of distance therein not nearer S than if AD was seen under an angle of 60 degrees.

Draw DU to the point of distance, intersecting AS in B; then from the point B draw BC parallel to AD; and you will have the first perspective square ABCD, equal to a third part of the intended depth.

Draw CV to the point of distance, intersecting AS in E; then from the point E draw EF parallel to AD; and you will have the second perspective square BEFC, which, added to the former one, makes two-thirds of the intended depth.

Draw FW to the point of distance, intersecting AS in G; then from the point G draw GH parallel to AD; and you will have the third perspective square

EGHF, which, with the former two, makes the whole depth AGHD three times as great as the width AD, in a perspective view.

Divide AD into any number of equal parts, as suppose 8; and from the division-points a, b, c, d, &c. draw lines toward the point of sight S, and ending at GH; then through the points where the diagonals BD, EC, GF, cut these lines, draw lines parallel to AD; and you will have the parallelogram AGHD reticulated, or divided into 192 small and equal perspective squares.

Make AI and DM equal and perpendicular to AD; then draw IM, which will be equal and parallel to AD; and draw IS and MS to the point of sight S.

Divide AI, IM, and MD, into the same number of equal parts as AD is divided; and from these points of division draw lines toward the point of sight S, ending respectively at GK, KL, and LH.

From those points where the lines parallel to AD meet AG and DH draw upright lines parallel to AI and DM; and from the points where these lines meet IK and LM draw lines parallel to IM; then shade the work, as in the figure.

PROB. 32. *To represent a semicircular arch in perspective, as if it were standing on two upright walls, equal in height to the height of the observer's eye.*

After having gone through the preceding operation, this will be more easy by a bare view of fig. 2. in Plate CCCLXXXVII. than it could be made by any description; the method being so much like that of drawing and shading the square hollow.—We need only mention, that aTbEA and DFctd are the upright walls on which the semicircular arch is built; that S is the point of sight in the horizon Tt, taken in the centre of the arch; that d in fig. 1. is the point of distance; and that the two perspective squares ABCD and BEFC make the parallelogram AEFD of a length equal to twice its breadth AD.

PROB. 33. *To represent a square in perspective, as viewed by an observer standing directly even with one of its corners.*

In fig. 3. of Plate CCCLXXXVII. let A9BC be a true square, viewed by an observer standing at some distance from the corner C, and just even with the diagonal C9.

Let pSP be the horizon, parallel to the diagonal AB; and S the point of sight, even with the diagonal C9. Here it will be proper to have two points of distance p and P, equidistant from the point of sight S.

Draw the straight line 1 17 parallel to AB, and draw A8 and B10 parallel to CS. Take the distance between 8 and 9 in your compasses, and set it off all the way in equal parts from 8 to 1, and from 10 to 17.—The line 1 17 should be produced a good way further both to right and left hand from 9, and divided all the way in the same manner.

From these points of equal division, 8, 9, 10, &c. draw lines to the point of sight S, and also to the two points of distance p and P, as in the figure.

Now it is plain, that a c b 9 is the perspective representation of A9BC, viewed by an observer even with the corner C and diagonal C9.—But if there are other such squares lying even with this, and having the same position with respect to the line 1 17, it is evident that the observer, who stands directly even with the

corner C of the first square, will not be even with the like corners G and K of the others; but will have an oblique view of them, over the sides FG and IK, which are nearest his eye: and their perspective representations will be *egf6* and *bki3*, drawn among the lines in the figure: of which, the spaces taken up by each side lie between three of the lines drawn toward the point of distance *p*, and three drawn to the other point of distance P.

PROB. 34. *To represent a common chair, in an oblique in perspective.*

The original lines to the point of sight S, and points of distance *p* and P, being drawn as in the preceding operation, choose any part of the plane, as *lmn13*, on which you would have the chair L to stand.—There are just as many lines (namely two) between *l* and *m* or *13* and *n*, drawn toward the point of distance *p*, at the left hand, as between *l* and *13*, or *m* and *n*, drawn to the point of distance P on the right: so that *lm*, *m n*, *n 13*, and *13 l*, form a perspective square.

From the four corners *l*, *m*, *n*, *13*, of this square raise the four legs of the chair to the perspective perpendicular height you would have them: then make the seat of the chair a square equal and parallel to *lmn13*, as taught in Prob. 18. which will make the two sides of the seat in the direction of the lines drawn toward the point of distance *p*, and the fore and back part of the seat in direction of the lines drawn to the other point of distance P. This done, draw the back of the chair leaning a little backward, and the cross bars therein tending toward the point of distance P. Then shade the work as in the figure; and the perspective chair will be finished.

PROB. 35. *To present an oblong square table in an oblique perspective view.*

In fig. 3. of Plate CCCLXXXVII. M is an oblong square table, as seen by an observer standing directly even with C 9 (see Prob. 33.), the side next the eye being perspectively parallel to the side *ac* of the square *ac b 9*.—The forementioned lines drawn from the line 1 17 to the two points of distance *p* and P, form equal perspective squares on the ground plane.

Choose any part of this plane of squares for the feet of the table to stand upon; as at *p*, *q*, *r*, and *s*, in direction of the lines *op* and *rs* for the two long sides, and *ts* and *qr* for the two ends; and you will have the oblong square or parallelogram *qrst* for the part of the floor or ground-plane whereon the table is to stand: and the breadth of this plane is here taken in proportion to the length as 6 to 10; so that, if the length of the table be ten feet, its breadth will be six.

On the four little perspective squares at *q*, *r*, *s*, and *t*, place the four upright legs of the table, of what height you please, so that the height of the two next the eye, at *o* and *p*, shall be terminated by a straight line *uv* drawn to the point of distance P. This done, make the leaf M of the table an oblong square, perspectively equal and parallel to the oblong square *qrst* on which the feet of the table stands. Then shade the whole, as in the figure, and the work will be finished.

If the line 1 17 was prolonged to the right and left hand, and equally divided throughout (as it is from 1 to 17), and if the lines which are drawn from *p* and to the right and left hand sides of the plate were

prolonged till they came to the extended line 1 17, they would meet it in the equal points of division. In forming large plans of this sort, the ends of slips of paper may be pasted to the right and left edges of the sheet on which the plan is to be formed.

Of the Anamorphosis, or reformation of distorted images.

By this means pictures that are so mishapen, as to exhibit no regular appearance of any thing to the naked eye, shall, when viewed by reflection, present a regular and beautiful image. The inventor of this ingenious device is not known. Simon Stevinus, who was the first that wrote upon it, does not inform us from whom he learned it. The principles of it are laid down by S. Vauzelard in his *Perspective Conique et Cylindrique*; and Gaspar Schott professes to copy Marius Bettinus in his description of this piece of artificial magic.

It will be sufficient for our purpose to copy one of the simplest figures of this writer, as by this means the mystery of this art will be sufficiently unfolded. Upon the cylinder of paper, or pasteboard, ABCD, draw whatever is intended to be exhibited, as the letters IHS. Then with a needle make perforations along the whole outline; and placing a candle, G, behind this cylinder, mark upon the ground plane the shadow of them, which will be distorted more or less, according to the position of the candle or the plane, &c. This being done, let the picture be an exact copy of this distorted image, let a metallic speculum be substituted in the place of the cylinder, and let the eye of the spectator have the same position before the cylinder that the candle had behind it. Then looking upon the speculum, he will see the distorted image restored to its proper shape. The reformation of the image, he says, will not easily be made exact in this method, but it will be sufficiently so to answer the purpose.

Other methods, more exact and geometrical than this, were found out afterwards: so that these pictures could be drawn by certain rules, without the use of a candle. Schott quotes one of these methods from Bettinus, another from Herigonius, and another from Kircher, which may be seen in his *Magia*, vol. i. p. 162, &c. He also gives an account of the methods of reforming pictures by speculums of conical and other figures.

Instead of copying any of these methods from Schott or Bettinus, we shall present our readers with that which Dr Smith hath given us in his *Optics*, vol. i. p. 250, as, no doubt, the best, and from which any person may easily make a drawing of this kind. The same description answers to two mirrors, one of which, fig. 7. is convex, and the other, fig. 8. is concave.

In order to paint upon a plane a deformed copy, ABCDEKIHGF of an original picture, which shall appear regular, when seen from a given point O, elevated above the plane, by rays reflected from a polished cylinder, placed upon the circle *lnp*, equal to its given base; from the point R, which must be supposed to lie perpendicularly under O, the place of the eye, draw two lines *RaRe*; which shall either touch the base of the cylinder, or else cut off two small equal segments from the sides of it, according as the copy is intended to be more or less deformed. Then, taking the eye, raised above R, to the given height RO, some.

Plate
CCCLXXXVII.
fig. 6.

somewhat greater than that of the cylinder, for a luminous point, describe the shadow $a e k f$ (of a square $a e x z$, fig. 36. or parallelogram standing upright upon its base $a e$, and containing the picture required) anywhere behind the arch $l n p$. Let the lines drawn from R to the extremities and divisions of the base a, b, c, d, e , cut the remotest part of the shadow in the points f, g, h, i, k , and the arch of the base in l, m, n, o, p ; from which points draw the lines $l A F, m B G, n C H, o D I, p E K$, as if they were rays of light that came from a focus R , and were reflected from the base $l n p$; so that each couple, as $l A, l R$, produced, may cut off equal segments from the circle. Lastly, transfer the lines $l a f, m b g$, &c. and all their parts, in the same order, upon the respective lines $l A F, m B G$, &c. and having drawn regular curves, by estimation, through the points A, B, C, D, E , through F, G, H, I, K , and through every intermediate order of points; the figure $A C E K H F$, so divided, will be the deformed copy of the square, drawn and divided upon the original picture, and will appear similar to it, when seen in the polished cylinder, placed upon the base $l n p$, by the eye in its given place O .

The practical methods of drawing these images seem to have been carried to the greatest perfection by J. Leopold, who, in the *Acta Lipsiensia* for the year 1712, has described two machines, one for the images to be viewed with a cylindrical, and the other with a conical, mirror. The person possessed of this instrument has nothing to do but to take any print he pleases, and while he goes over the outlines of it with one pen, another traces the anamorphosis.

By methods of this kind, groves of trees may be cut, so as to represent the appearance of men, horses, and other objects from some one point of view, which are not at all discernible in any other. This might easily be effected by one person placing himself in any particular situation, and giving directions to other persons what trees to lop, and in what manner. In the same method it has been contrived, that buildings of circular and other forms, and also whole groups of buildings, consisting of walls at different distances, and with different positions to one another, should be painted so as to exhibit the exact representation of particular objects, which could only be perceived in one situation. Bettinus has illustrated this method by drawings in his *Apiaria*.

It may appear a bold assertion to say, that the very short sketch now given of the art of perspective is a sufficient foundation for the whole practice, and includes all the expeditious rules peculiar to the problems which most generally occur. It is, however, true, and the intelligent reader will see, that the two theorems on which the whole rests, include every possible case, and apply with equal facility to pictures and originals in any position, although the examples are selected of perpendicular pictures, and of originals referred to horizontal planes, as being the most frequent. The scientific foundation being so simple, the structure need not be complex, nor swell into such volumes as have been published on the subject: volumes which, by their size, deter from the perusal, and give the simple art the appearance of intricate mystery; and,

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by their prices, defeat the design of their authors, viz. the dissemination of knowledge among the practitioners. The treatises on perspective acquire their bulk by long and tedious discourses, minute explanations of common things, or by great numbers of examples; which indeed do make some of these books valuable by the variety of curious cuts, but do not at all instruct the reader by any improvements made in the art itself. For it is evident, that most of those who have treated this subject have been more conversant in the practice of designing than in the principles of geometry; and therefore when, in their practice, the cases which have offered have put them on trying particular expedients, they have thought them worth communicating to the public as improvements of the art; and each author, fond of his own little expedient (which a scientific person would have known for an easy corollary from the general theorem), have made it the principle of a practical system—and in this manner narrowing instead of enlarging the knowledge of the art; and the practitioner, tired of the bulk of the volume, in which a single maxim is tediously spread out, and the principle on which it is founded kept out of his sight, contents himself with a remembrance of the maxim (not understood), and keeps it slightly in his eye, to avoid gross errors. We can appeal to the whole body of painters and draughtsmen for the truth of this assertion; and it must not be considered as an imputation on them of remissness or negligence, but as a necessary consequence of the ignorance of the authors from whom they have taken their information. This is a strong term, but it is not the less just. Several mathematicians of eminence have written on perspective, treating it as the subject of pure geometry, as it really is; and the performances of Dr Brook Taylor, Gravesande, Wolf, De la Caille, Emerson, are truly valuable, by presenting the art in all its perspicuous simplicity and universality. The works of Taylor and Emerson are more valuable, on account of the very ingenious and expeditious constructions which they have given, suited to every possible case. The merit of the first author has been universally acknowledged by all the British writers on the subject, who never fail to declare that their own works are composed on the principle of Dr Brook Taylor: but any man of science will see that these authors have either not understood them, or aimed at pleasing the public by fine cuts and uncommon cases; for, without exception, they have omitted his favourite constructions, which had gained his predilection by their universality, and attached themselves to inferior methods, more usually expedient perhaps, or inventions (as they thought) of their own. What has been given in this article is not *professed* to be according to the principles of Dr Brook Taylor, because the principles are not peculiar to him, but the necessary results of the theory itself, and inculcated by every mathematician who had taken the trouble to consider the subject. They are sufficient not only for directing the ordinary practice, but also for suggesting modes of construction for every case out of the common track. And a person of ingenuity will have a laudable enjoyment in thus, without much stretch of thought, inventing rules for himself; and will be better pleased with such fruits of his own ingenuity, than in reading the tedious explanations of examples devised

B b

by

by another. And for this purpose we would, with Dr Taylor, "advise all our readers not to be contented with the scheme they find here; but, on every occasion, to draw new ones of their own, in all the variety of circumstances they can think of. This will take up more time at first, but they will find the vast benefit and pleasure of it by the extensive notions it will give them of the nature of the principles."

The art of perspective is necessary to all arts where there is any occasion for designing; as architecture, fortification, carving, and generally all the mechanical arts; but it is more particularly necessary to the art of painting, which can do nothing without it. A figure in a picture, which is not drawn according to the rules of perspective, does not represent what is intended, but something else. Indeed we hesitate not to say, that a picture which is faulty in this particular, is as blameable, or more so, than any composition in writing which is faulty in point of orthography, or grammar. It is generally thought very ridiculous to pretend to write an heroic poem, or a fine discourse, upon any subject, without understanding the propriety of the language in which we write; and to us it seems no less ridiculous for one to pretend to make a good picture without understanding perspective: Yet how many pictures are there to be seen, that are highly valuable in other respects, and yet are entirely faulty in this point? Indeed this fault is so very general, that we cannot remember that we ever have seen a picture that has been entirely without it; and what is the more to be lamented, the greatest masters have been the most guilty of it. Those examples make it to be the less regarded; but the fault is not the less, but the more to be lamented, and deserves the more care in avoiding it for the future. The great occasion of this fault, is certainly the wrong method that is generally used in educating of persons in this art: for the young people are generally put immediately to drawing; and when they have acquired a facility in that, they are put to colouring. And these things they learn by rote, and by practice only; but are not at all instructed in any rules of art. By which means, when they come to make any designs of their own, though they are very expert at drawing out and colouring every thing that offers itself to their fancy; yet for want of being instructed in the strict rules of art, they do not know how to govern their inventions with judgment, and become guilty of so many gross mistakes; which prevent themselves, as well as others, from finding that satisfaction they otherwise would do in their performances. To correct this for the future, we would recommend it to the masters of the art of painting, to consider if it would not be necessary to establish a better method for the education of their scholars, and to begin their instructions with the technical parts of painting, before they let them loose to follow the inventions of their own uncultivated imaginations.

The art of painting, taken in its full extent, consists of two parts; the inventive, and the executive. The inventive part is common with poetry, and belongs more properly and immediately to the original design (which it invents and disposes in the most proper and agreeable manner) than to the picture, which is only a copy of that design already formed in the imagination of the artist. The perfection of this art of painting depends upon the thorough knowledge the artist has of all the parts of his subject; and the beauty of it consists in the happy choice and disposition that he makes of it: And it is in this that the genius of the artist discovers and shows itself, while he indulges and humours his fancy, which here is not confined. But the other, the executive part of painting, is wholly confined and strictly tied to the rules of art, which cannot be dispensed with upon any account; and therefore in this the artist ought to govern himself entirely by the rules of art, and not to take any liberties whatsoever. For any thing that is not truly drawn according to the rules of perspective, or not truly coloured or truly shaded, does not appear to be what the artist intended, but something else. Wherefore, if at any time the artist happens to imagine that his picture would look the better, if he should swerve a little from these rules, he may assure himself, that the fault belongs to his original design, and not to the strictness of the rules; for what is perfectly agreeable and just in the real original objects themselves, can never appear defective in a picture where those objects are exactly copied.

Therefore to offer a short hint of thoughts we have some time had upon the method which ought to be followed in instructing a scholar in the executive part of painting; we would first have him learn the most common effects of practical geometry, and the first elements of plain geometry and common arithmetic. When he is sufficiently perfect in these, we would have him learn perspective. And when he has made some progress in this, so as to have prepared his judgment with the right notions of the alterations that figures must undergo, when they come to be drawn on a flat, he may then be put to drawing by view, and be exercised in this along with perspective, till he comes to be sufficiently perfect in both. Nothing ought to be more familiar to a painter than perspective; for it is the only thing that can make the judgment correct, and will help the fancy to invent with ten times the ease that it could do without it.

We earnestly recommend to our readers the careful perusal of Dr Taylor's Treatise, as published by Colson in 1749, and Emerson's published along with his Optics. They will be surprised and delighted with the instruction they will receive; and will then truly estimate the splendid volumes of other authors and see their frivolity.

P E R

Perspective.

PERSPECTIVE is also used for a kind of picture or painting, frequently seen in gardens, and at the ends of galleries; designed expressly to deceive the sight by

P E R

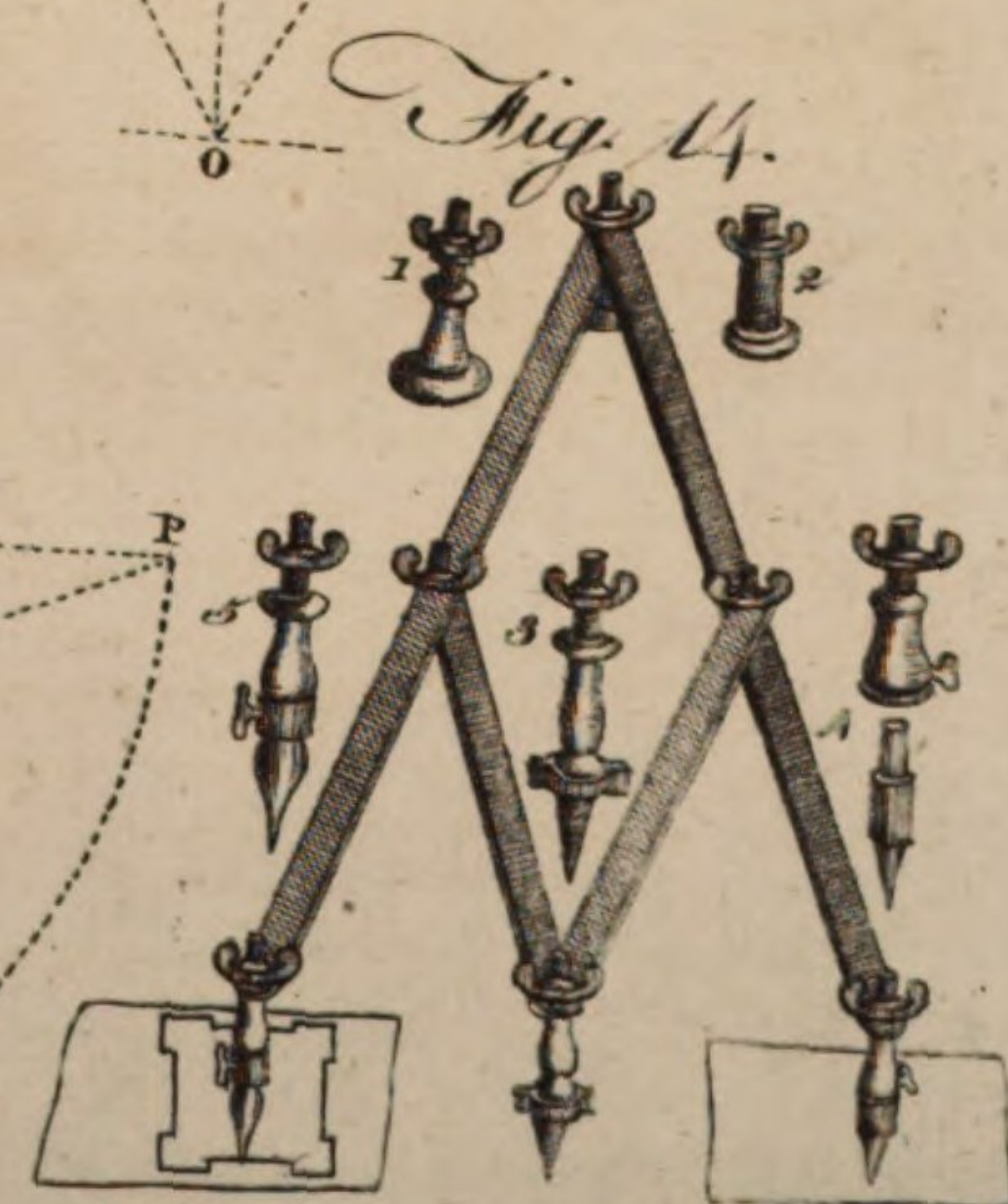
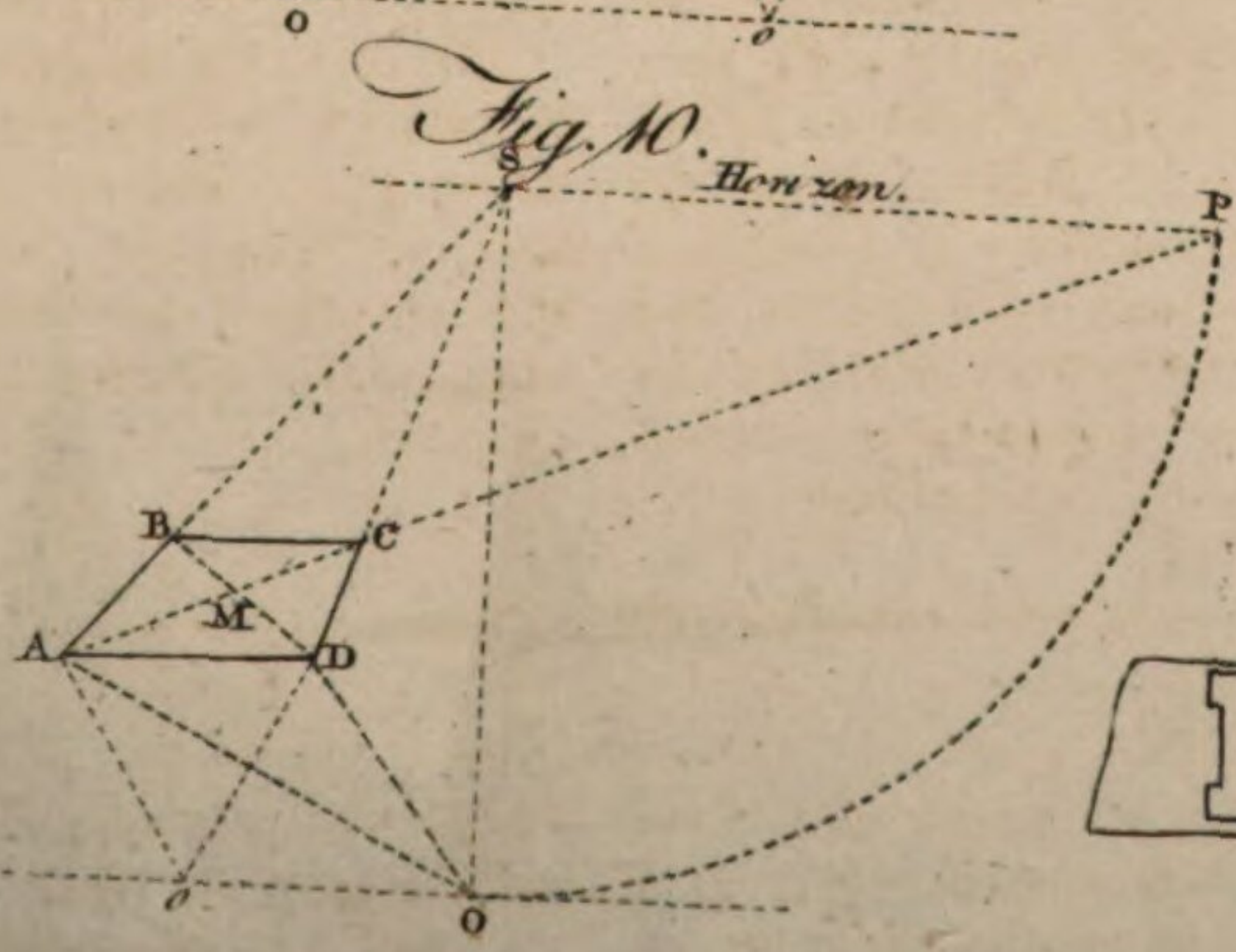
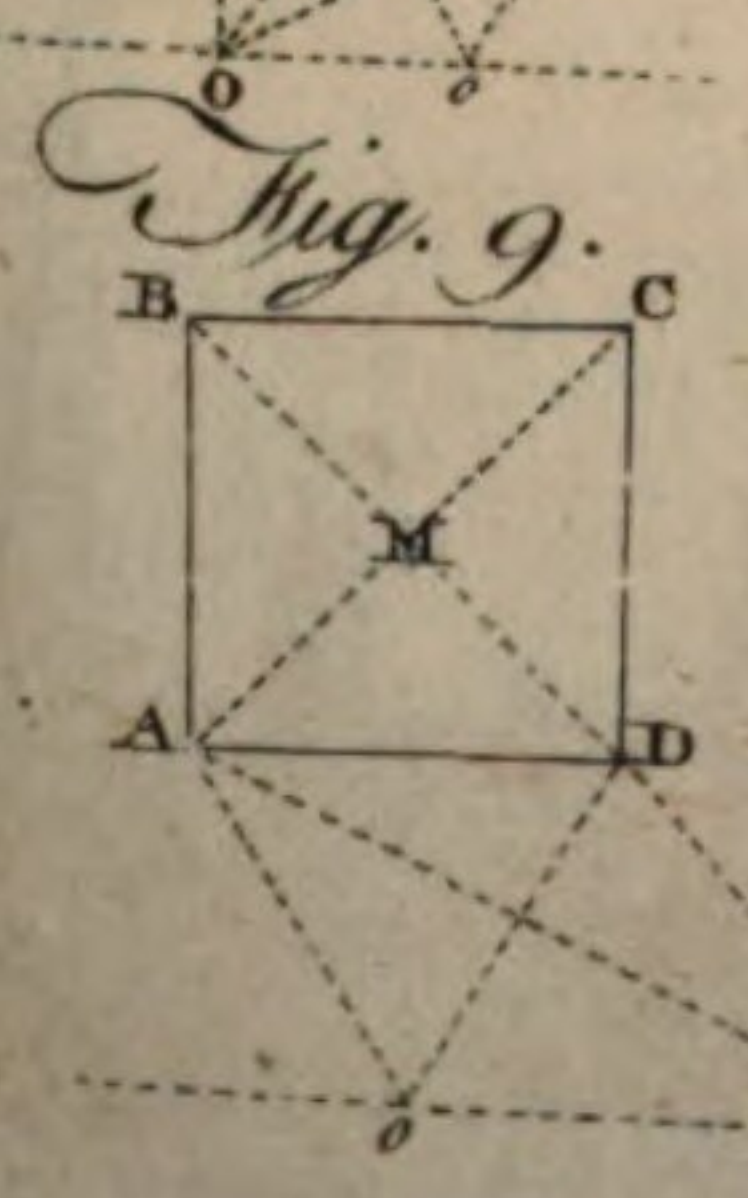
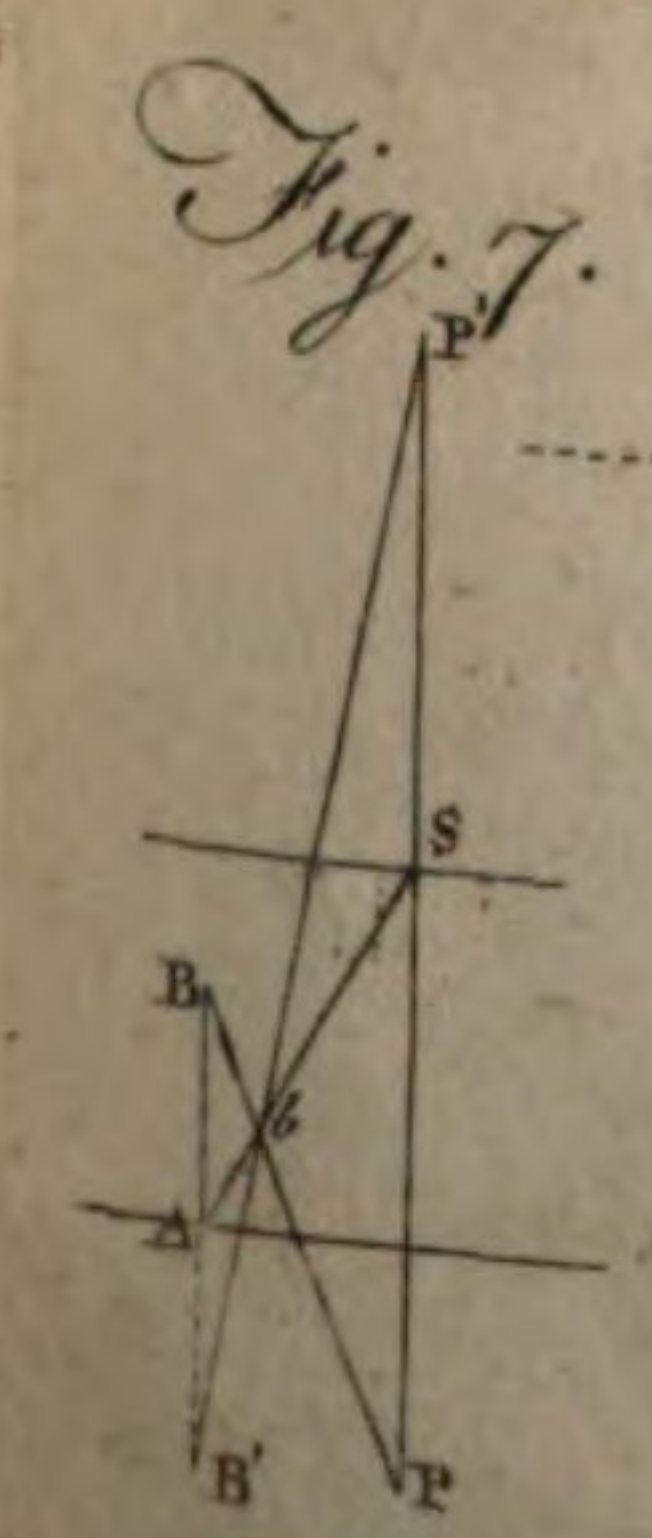
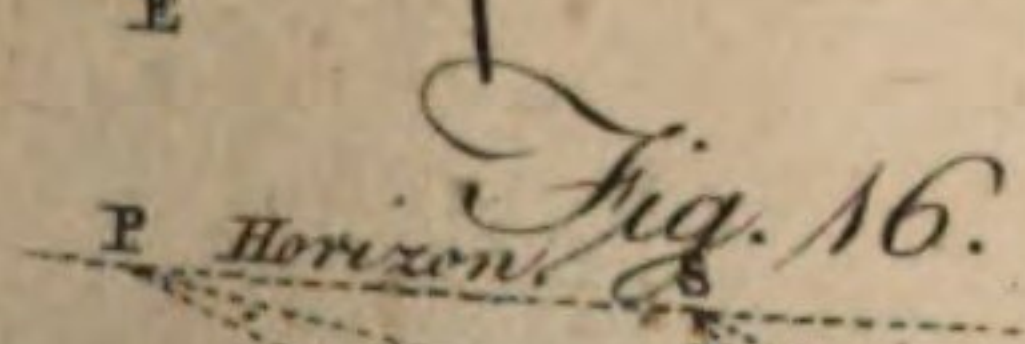
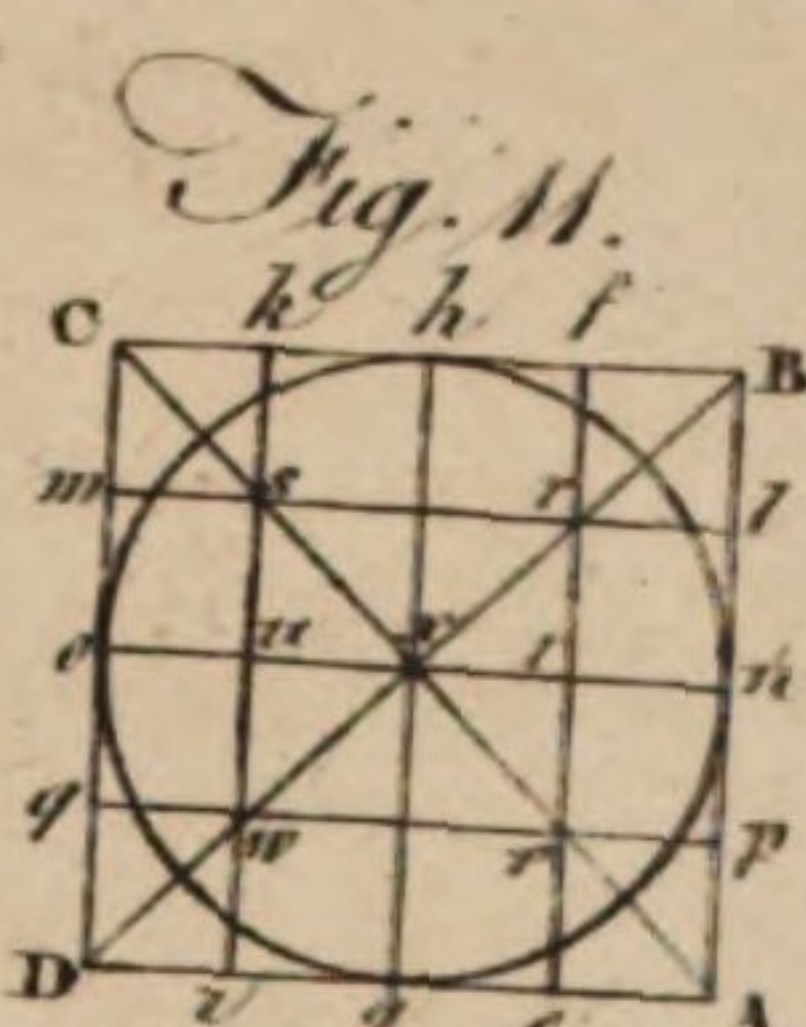
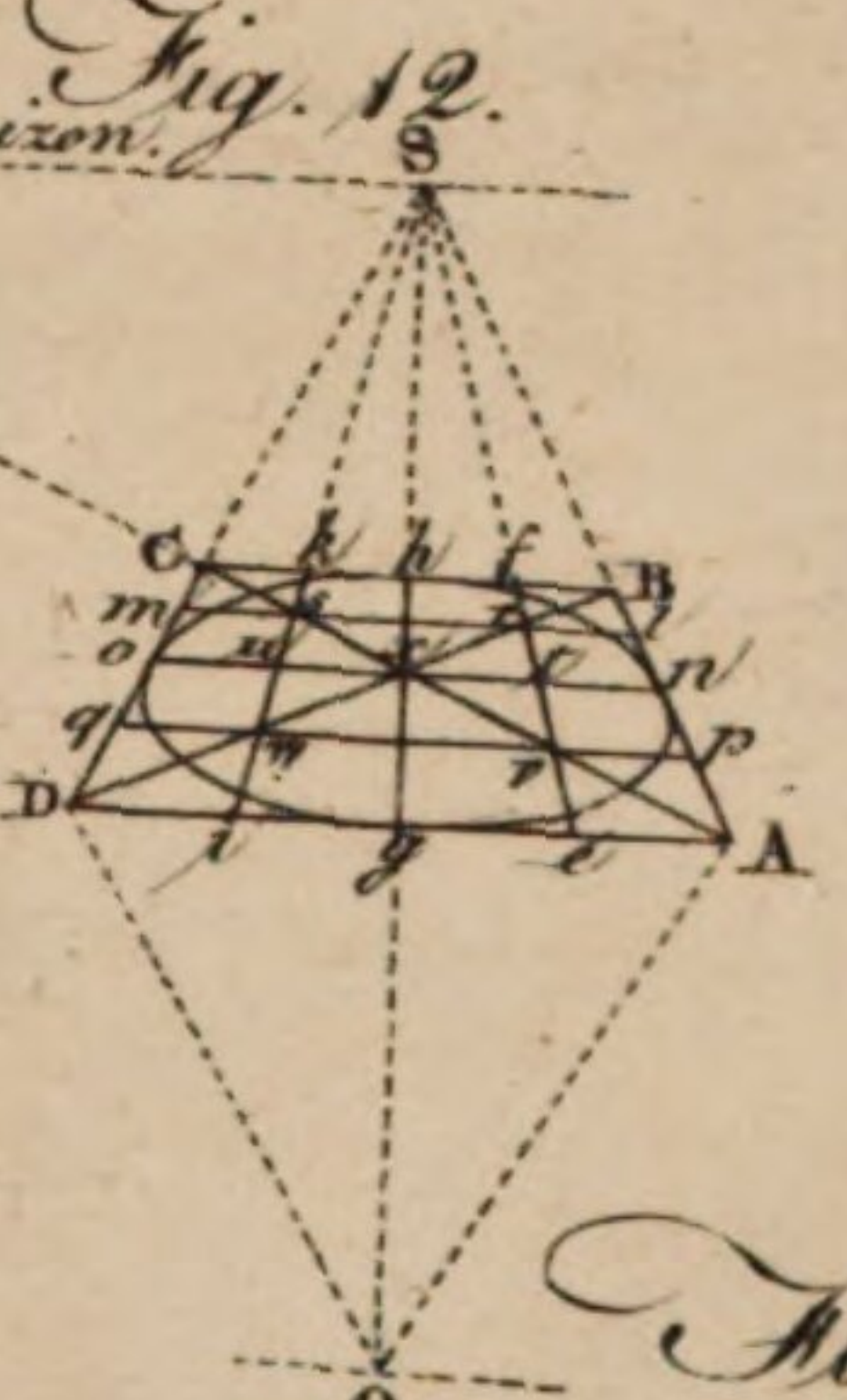
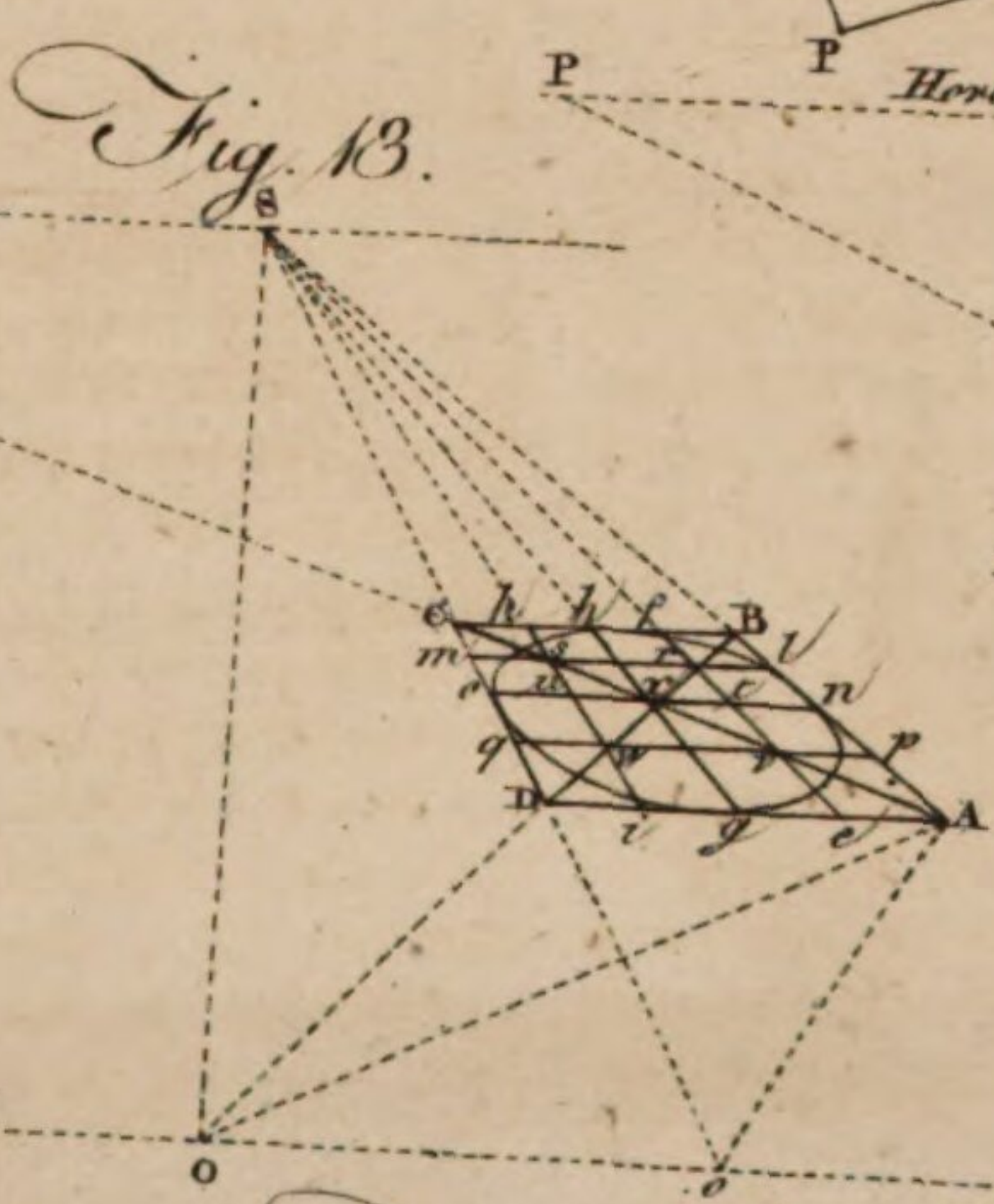
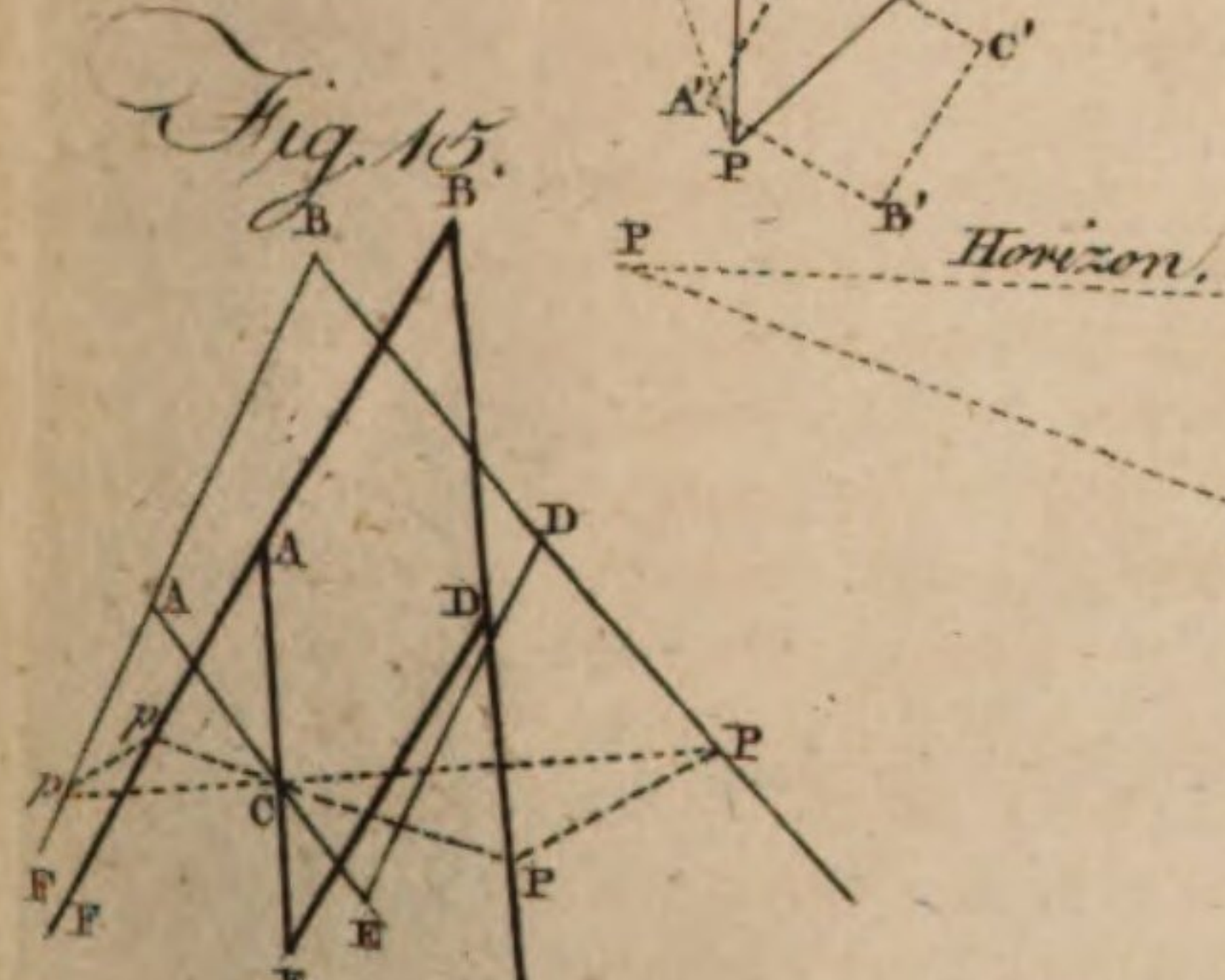
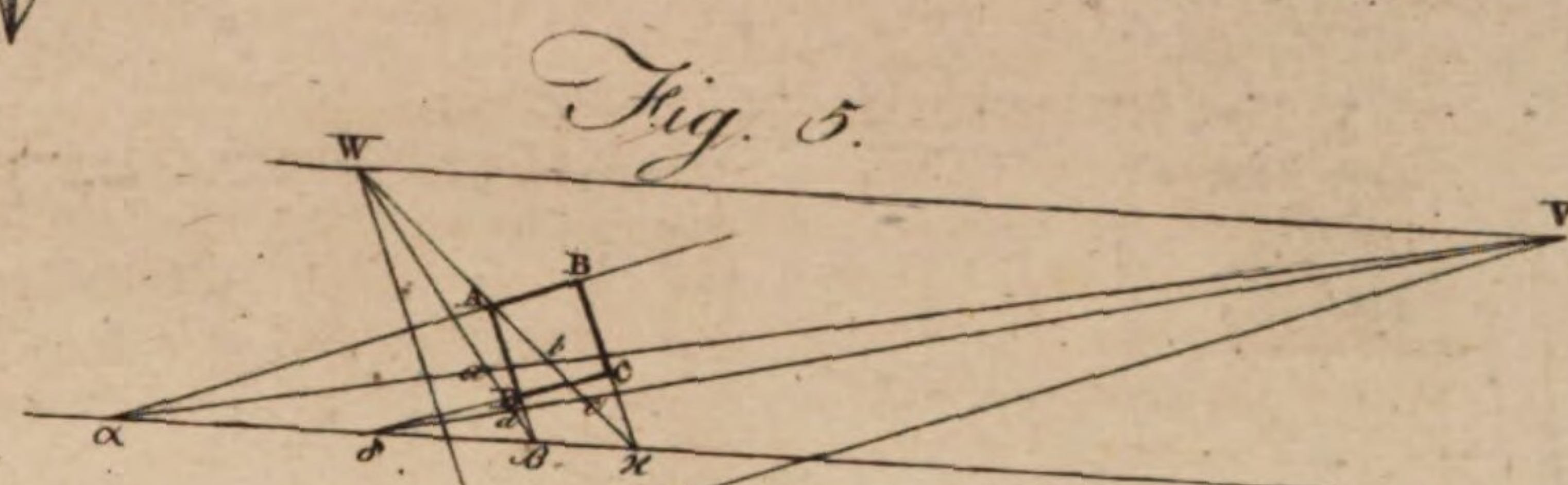
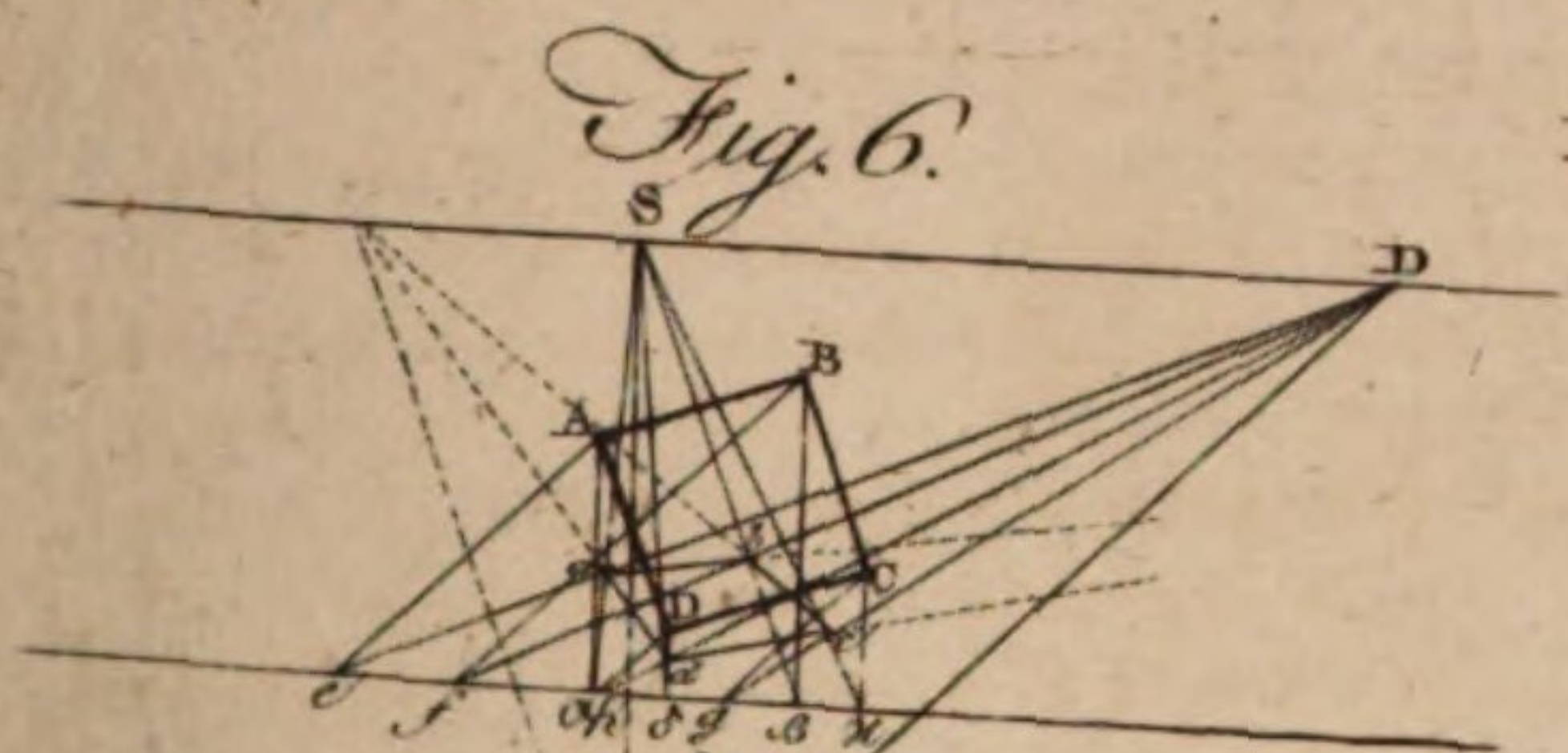
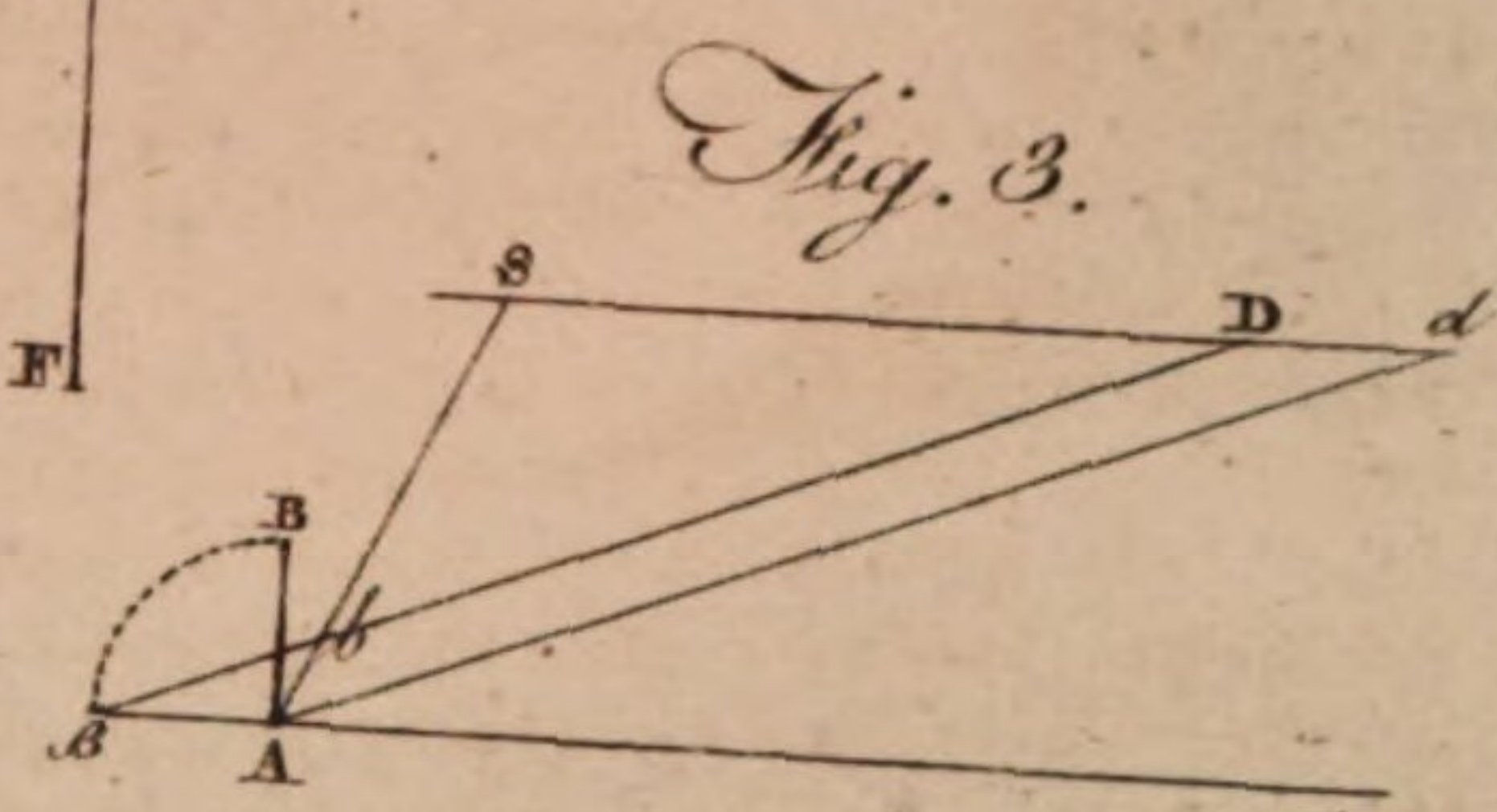
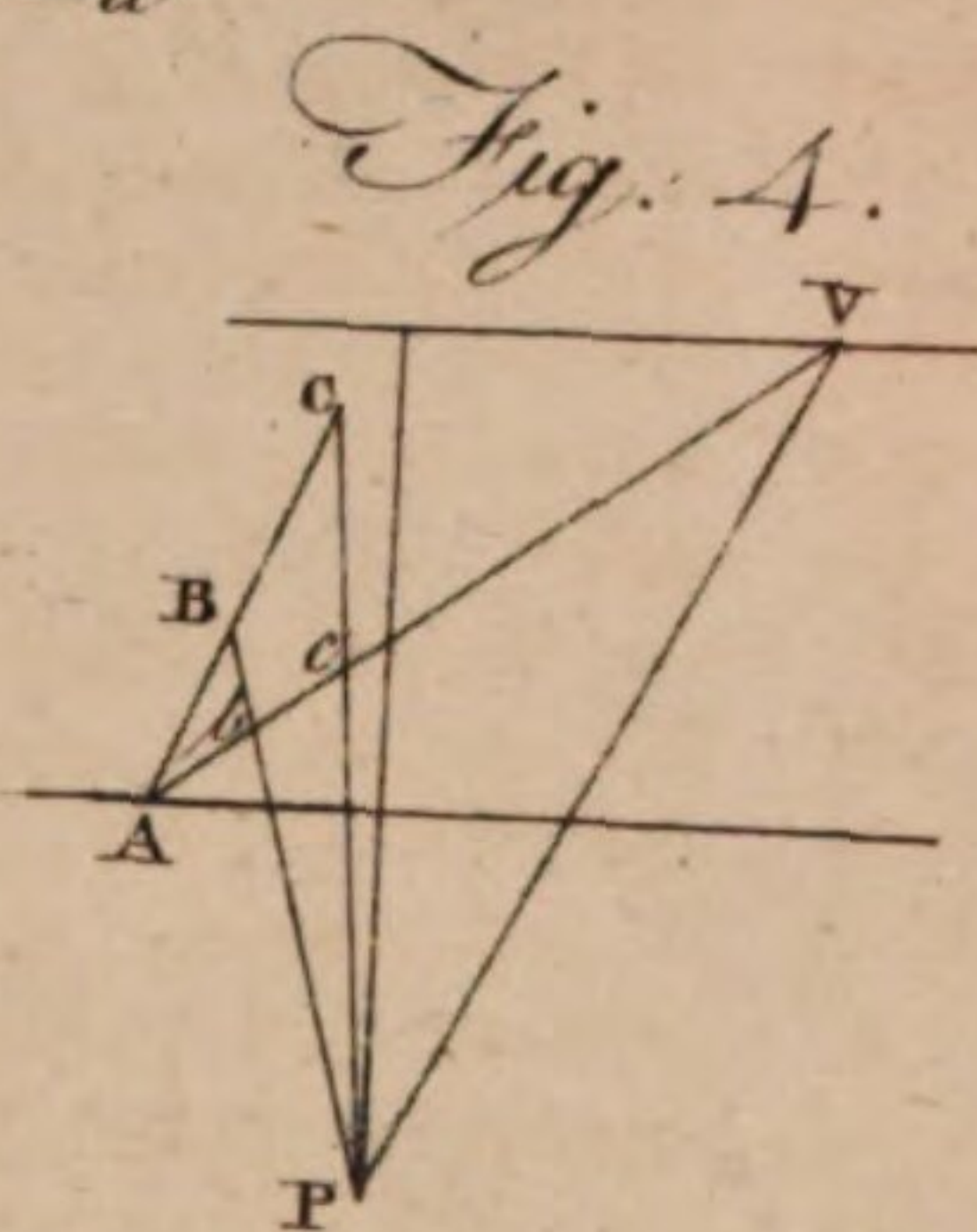
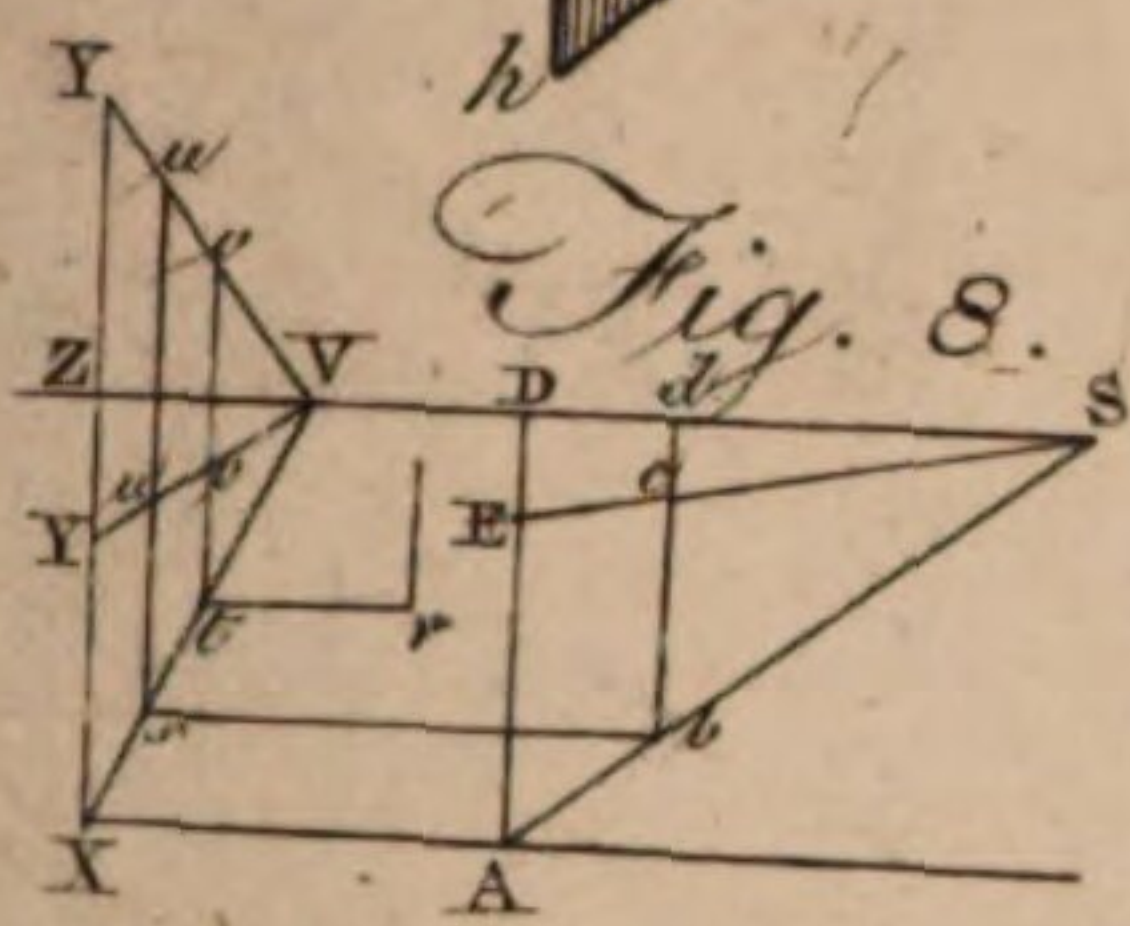
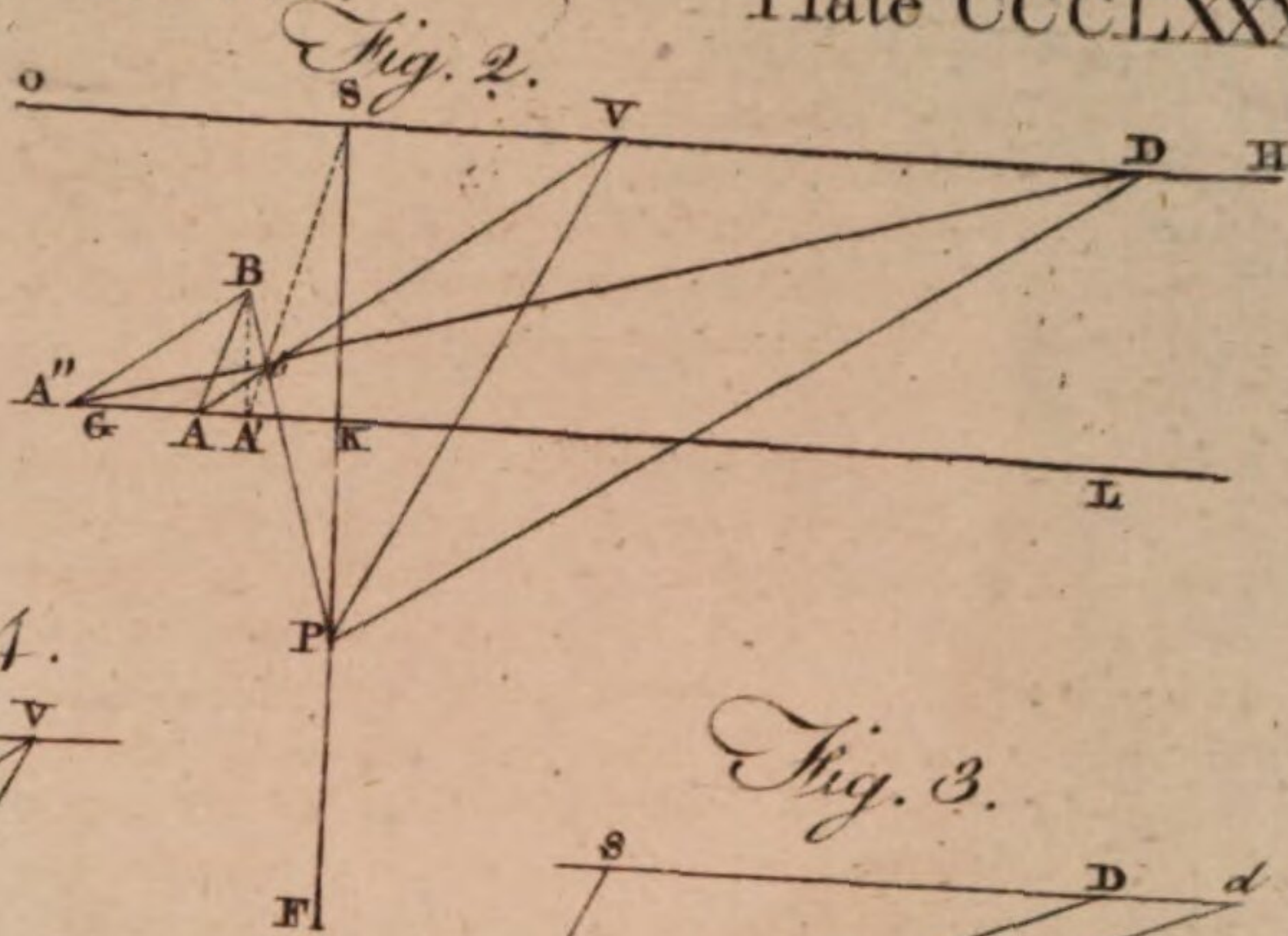
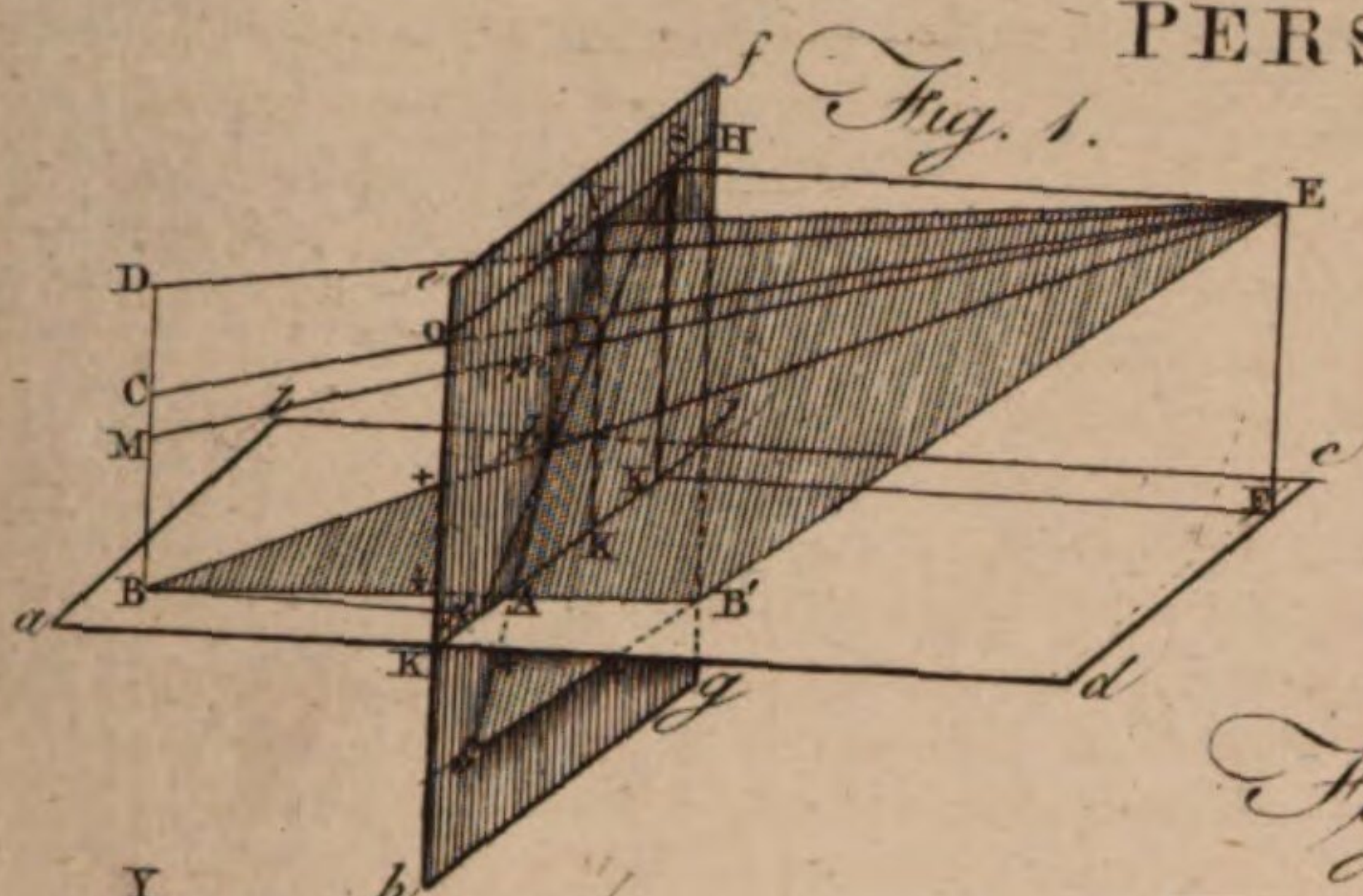
representing the continuation of an alley, a building, landscape, or the like.

Aerial PERSPECTIVE, is sometimes used as a general deno-

Perspective.

PERSPECTIVE.

Plate CCCLXXXIII.



A. Bell Pin. Mat. Sculptor fecit.

Fig. 1.

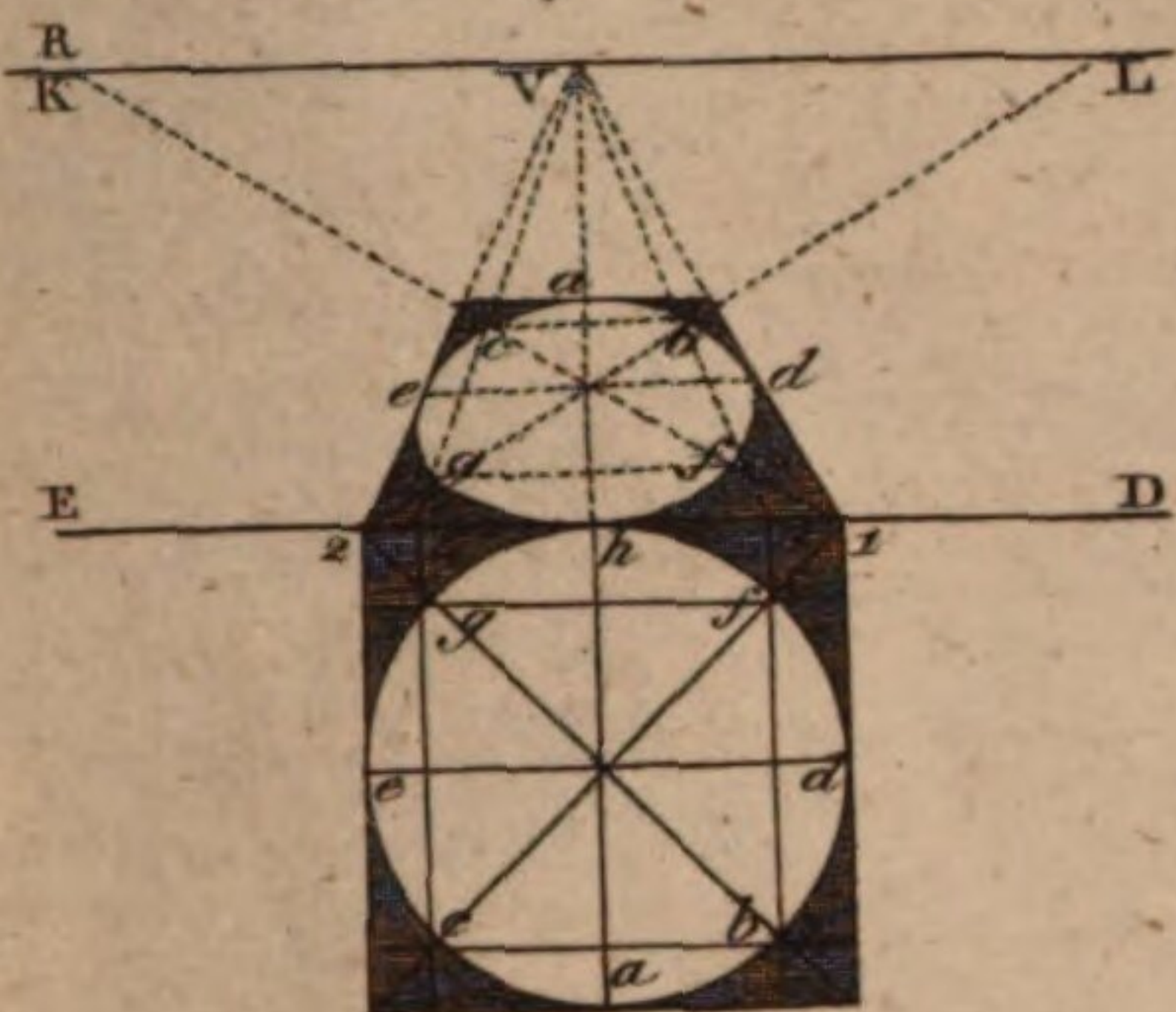


Fig. 2.

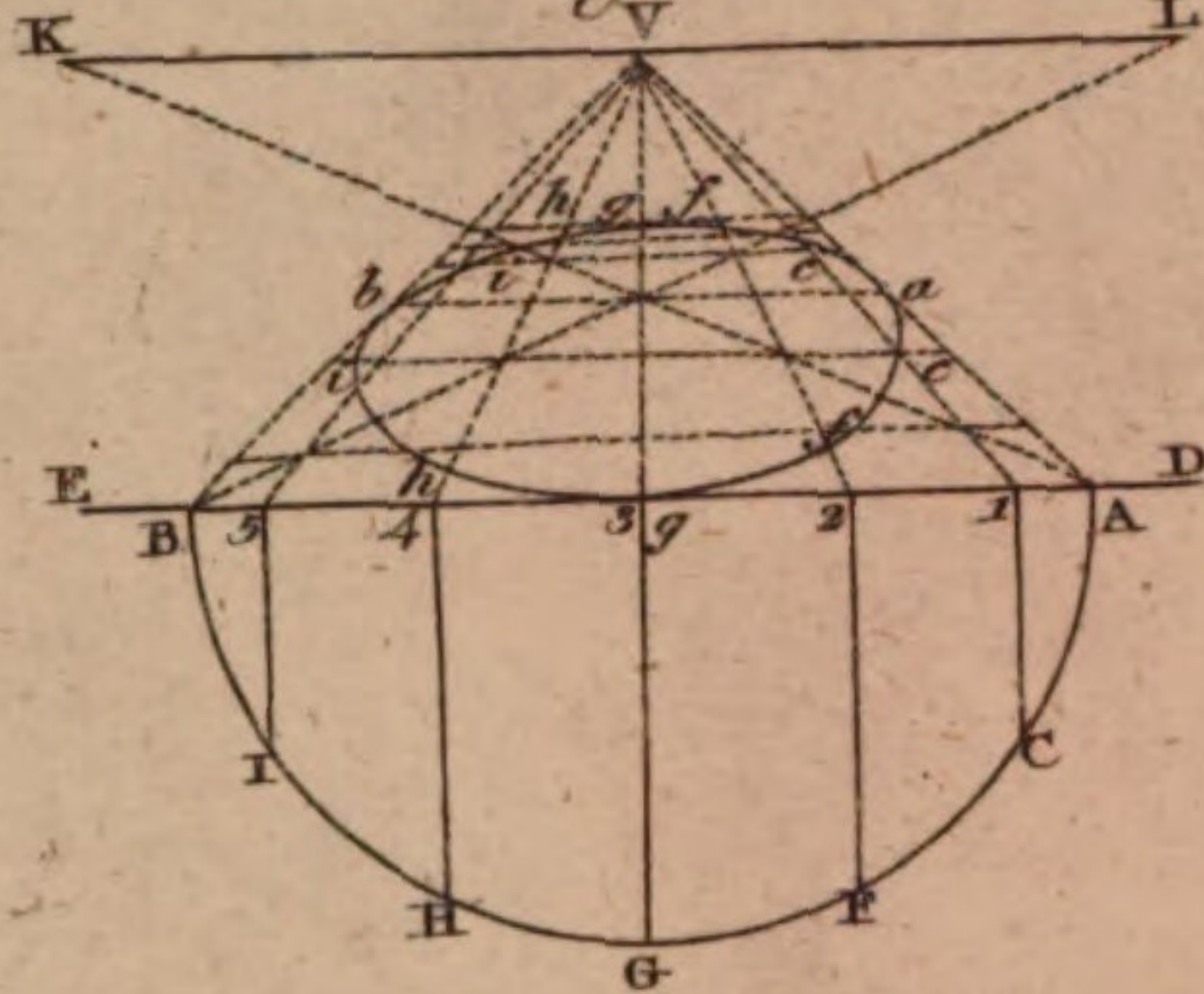
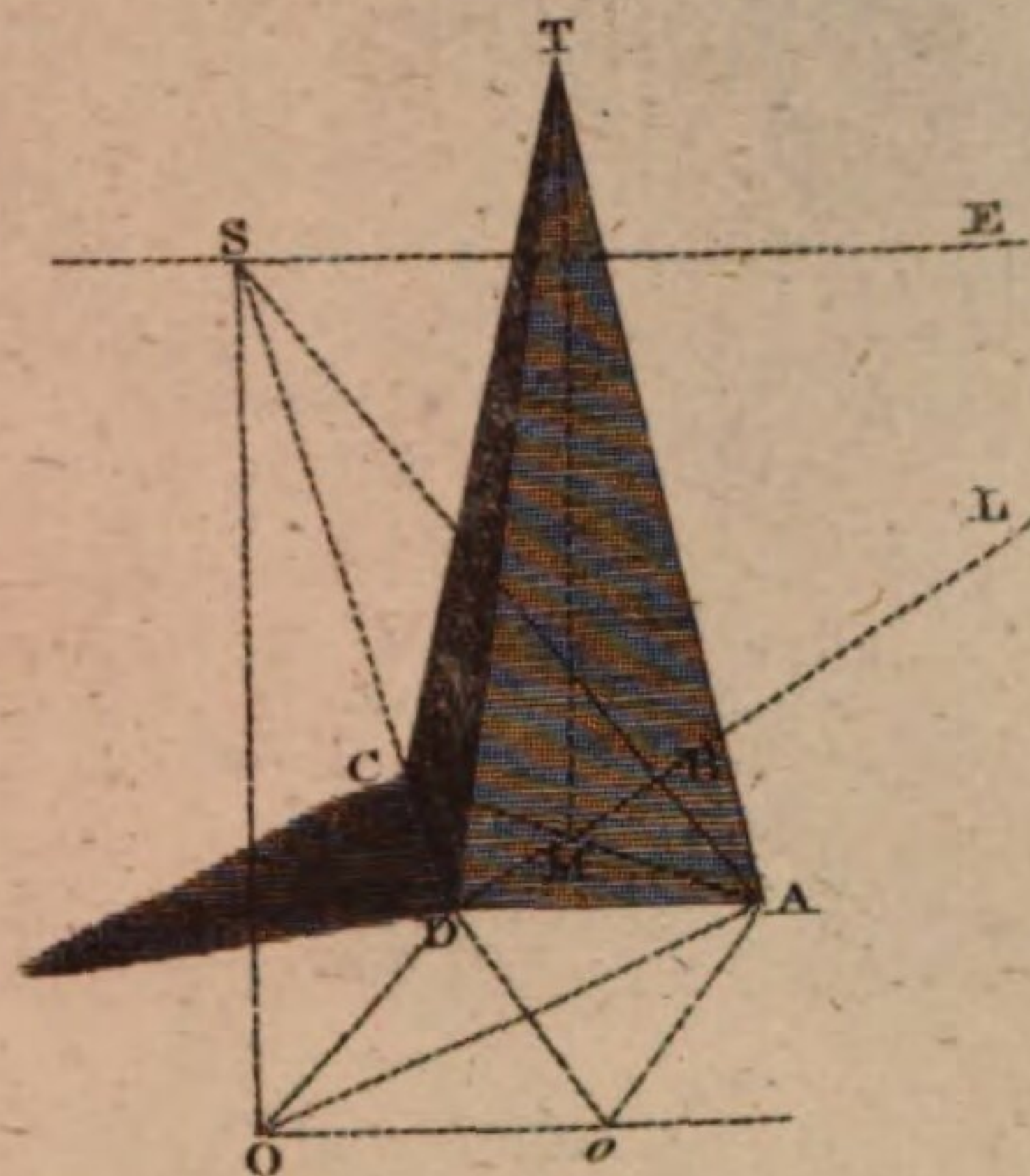


Fig. 4. N.º 1.



Horizon

Fig. 5.

Fig. 3.

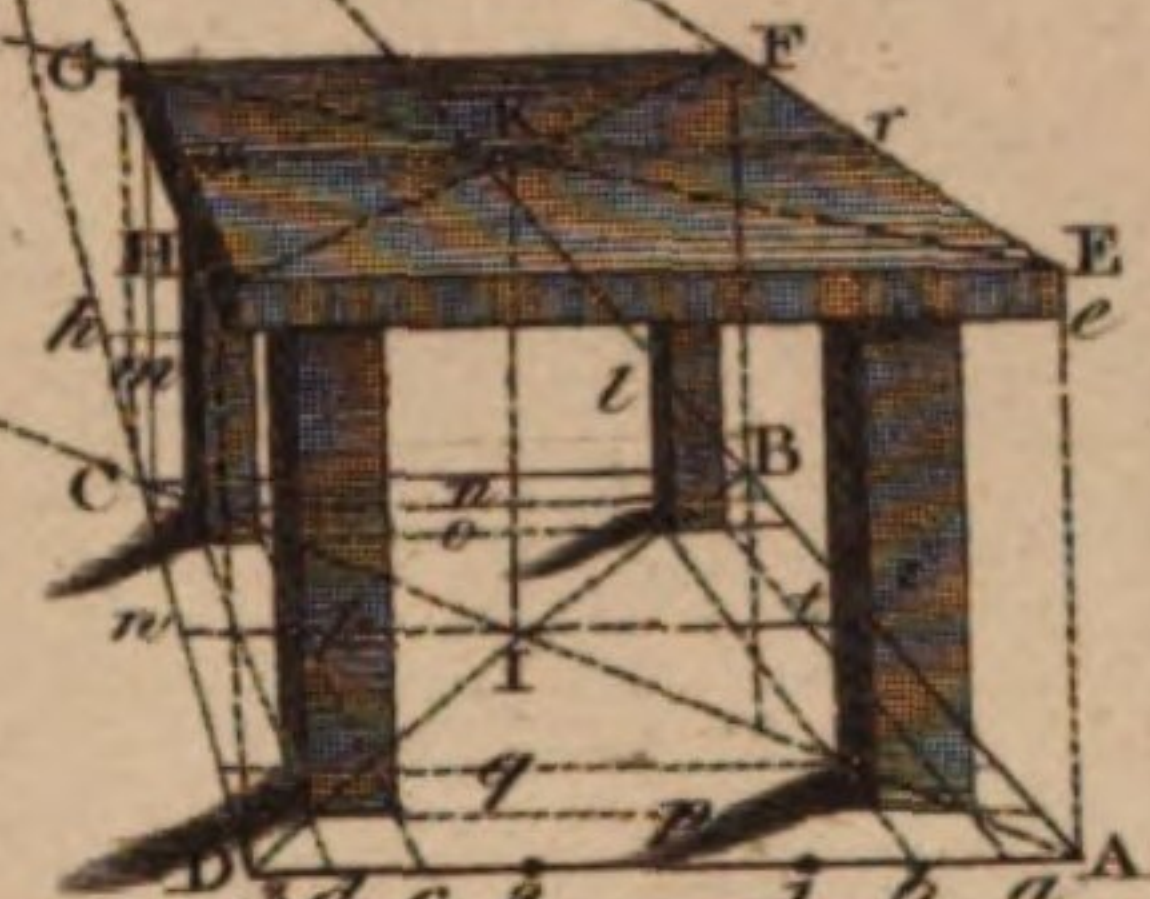
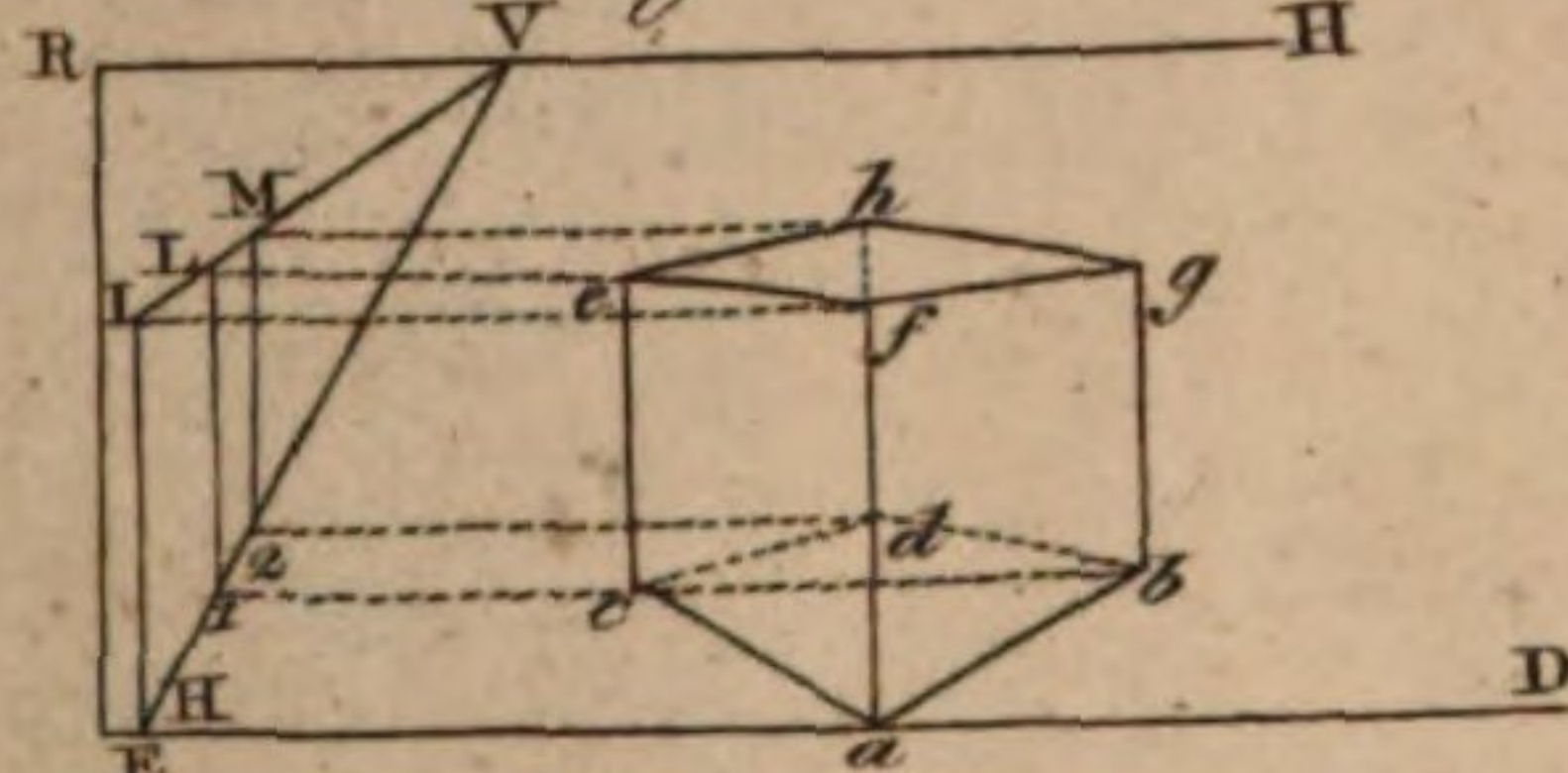


Fig. 4. N.º 2.



Horizon

Fig. 6.

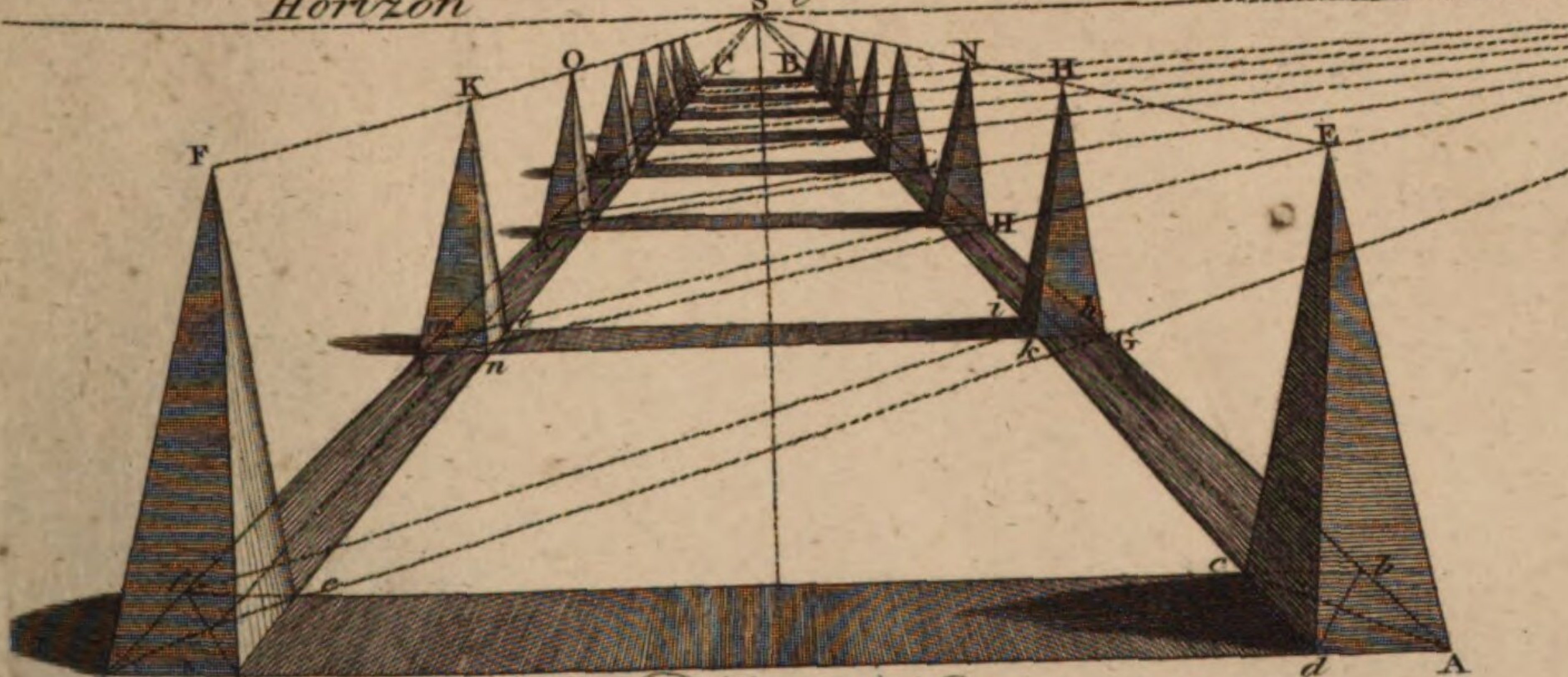
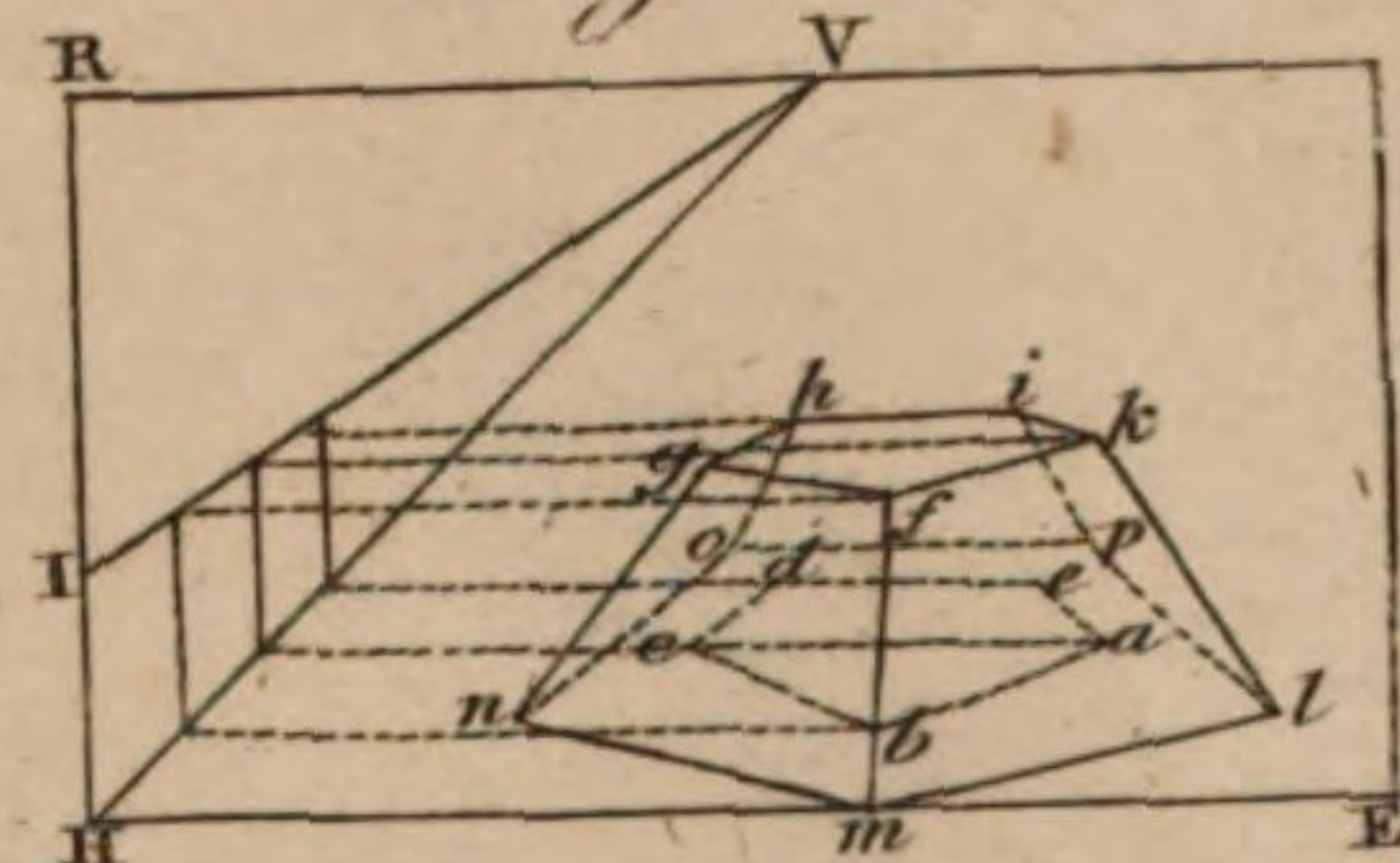


Fig. 7. N.º 1.

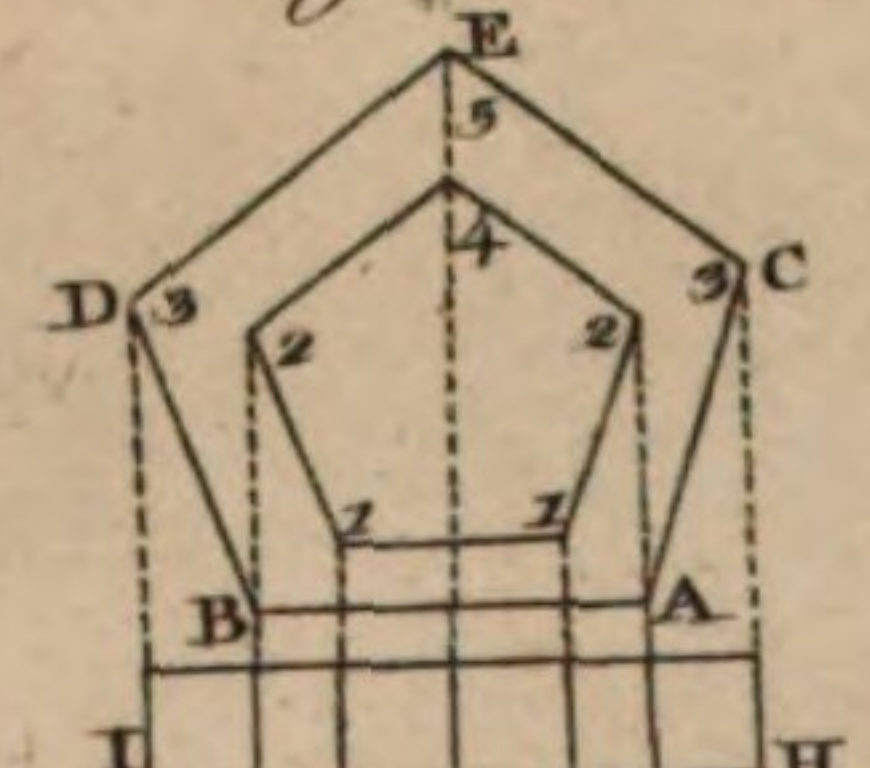


Fig. 8. N.º 1.

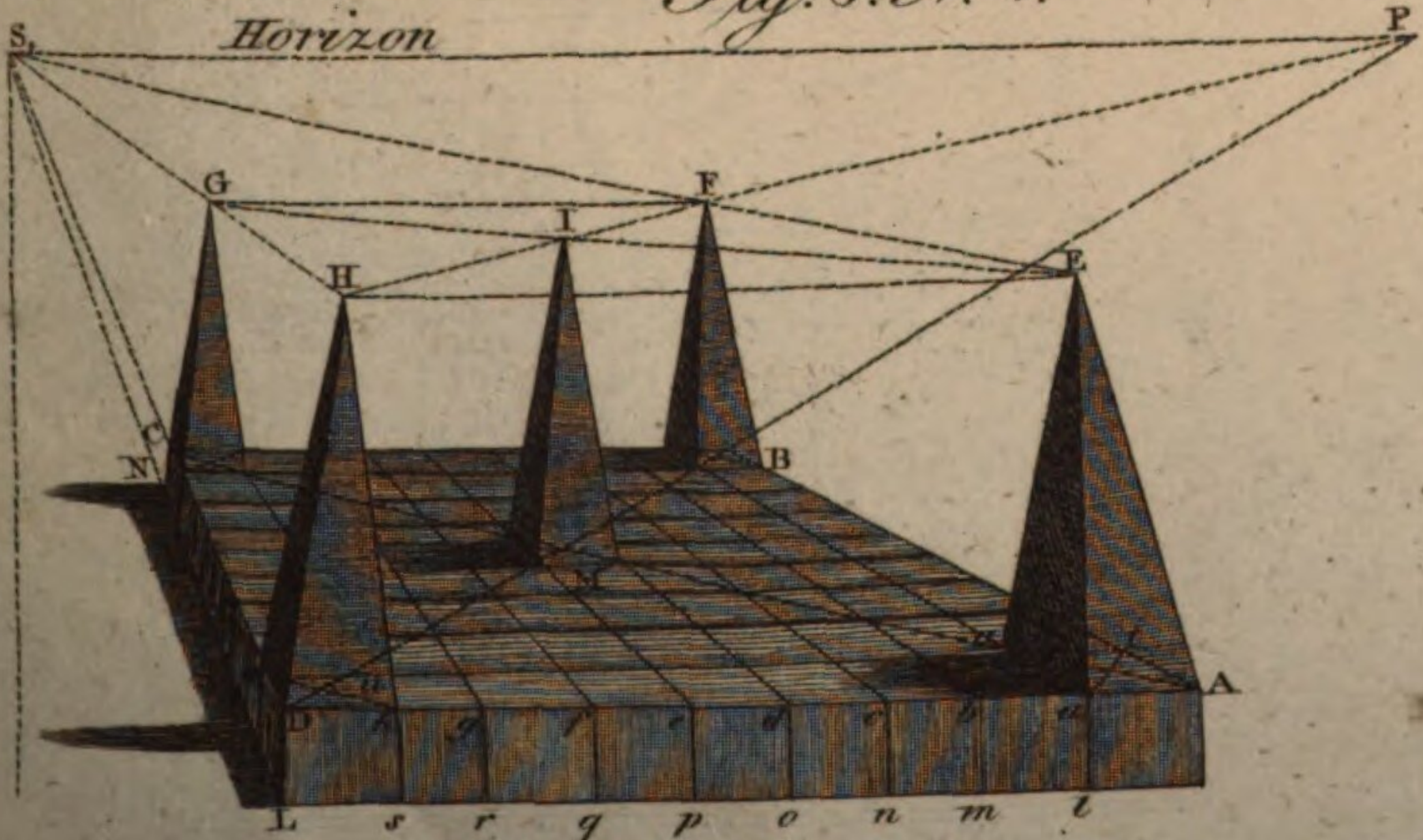


Fig. 7. N.º 2.

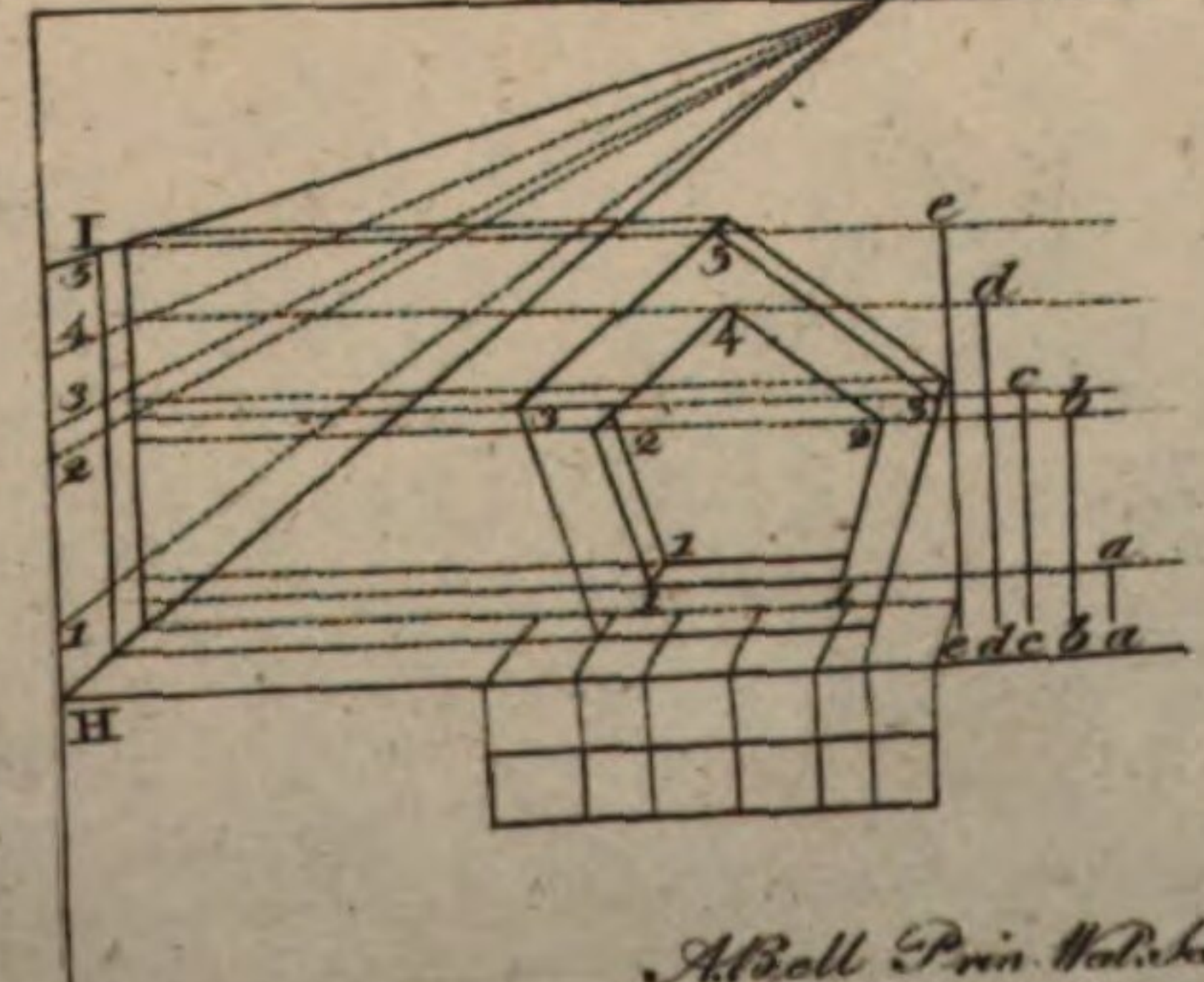


Fig. 1.

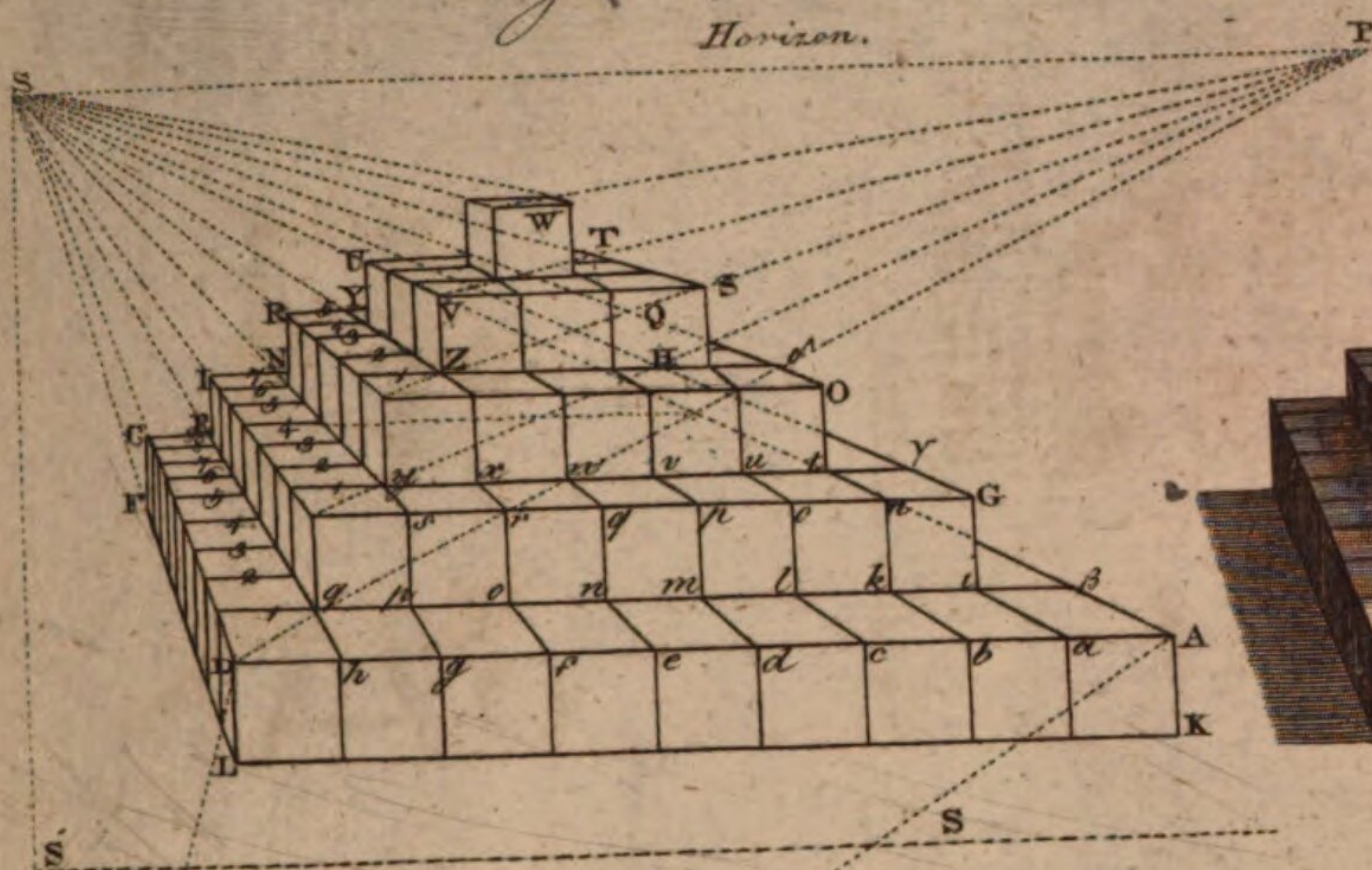


Fig. 2.

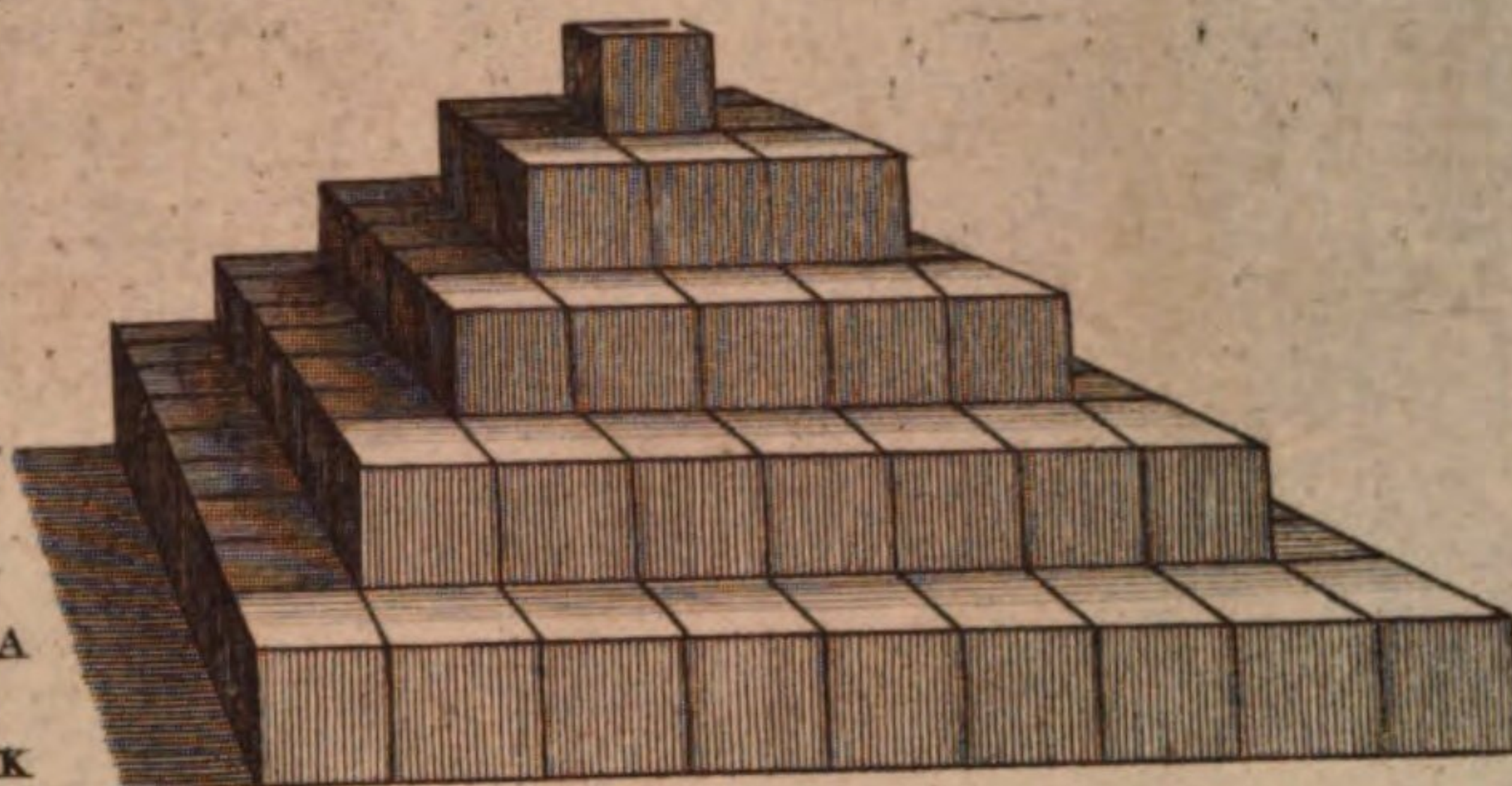


Fig. 3.

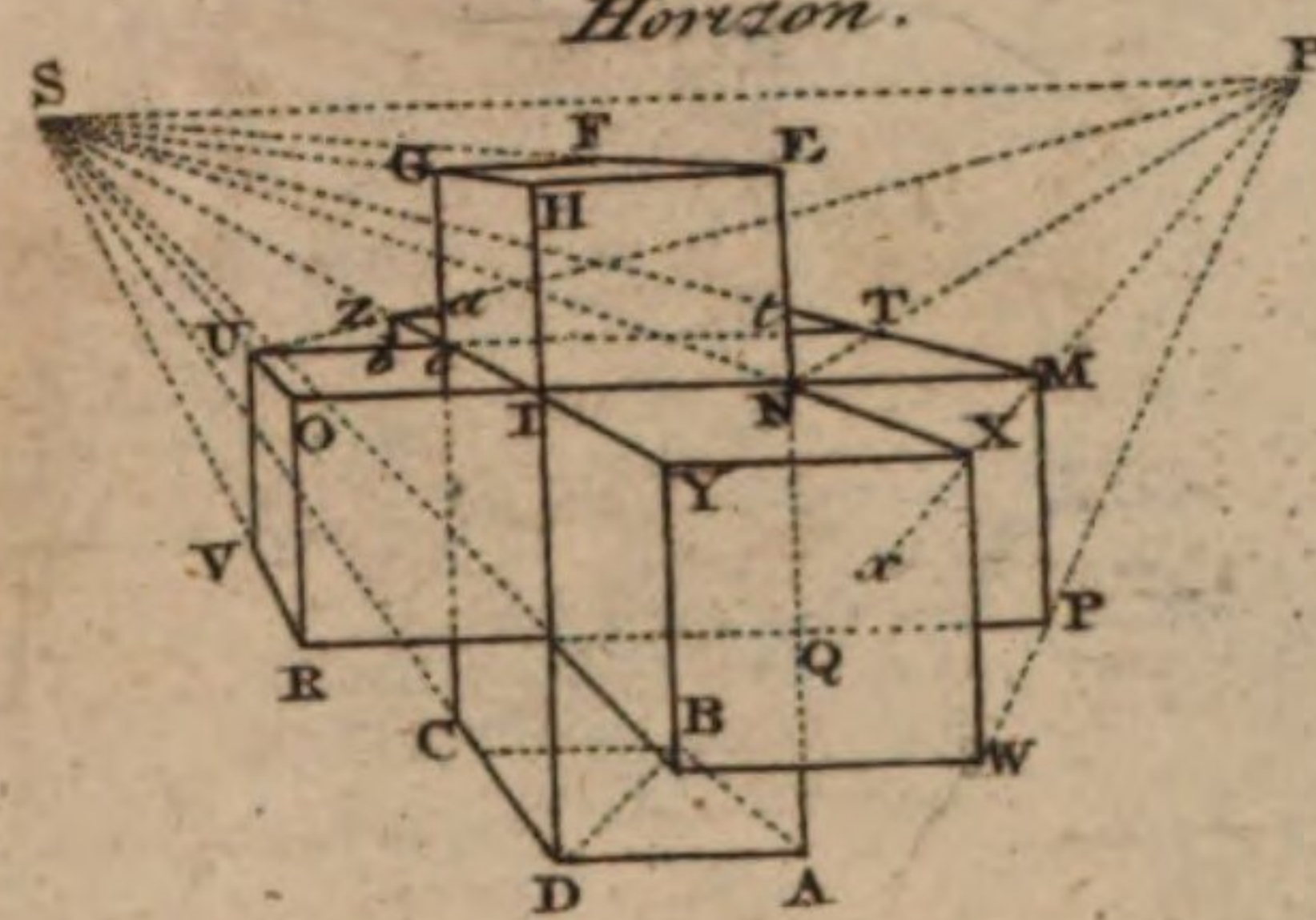


Fig. 5.

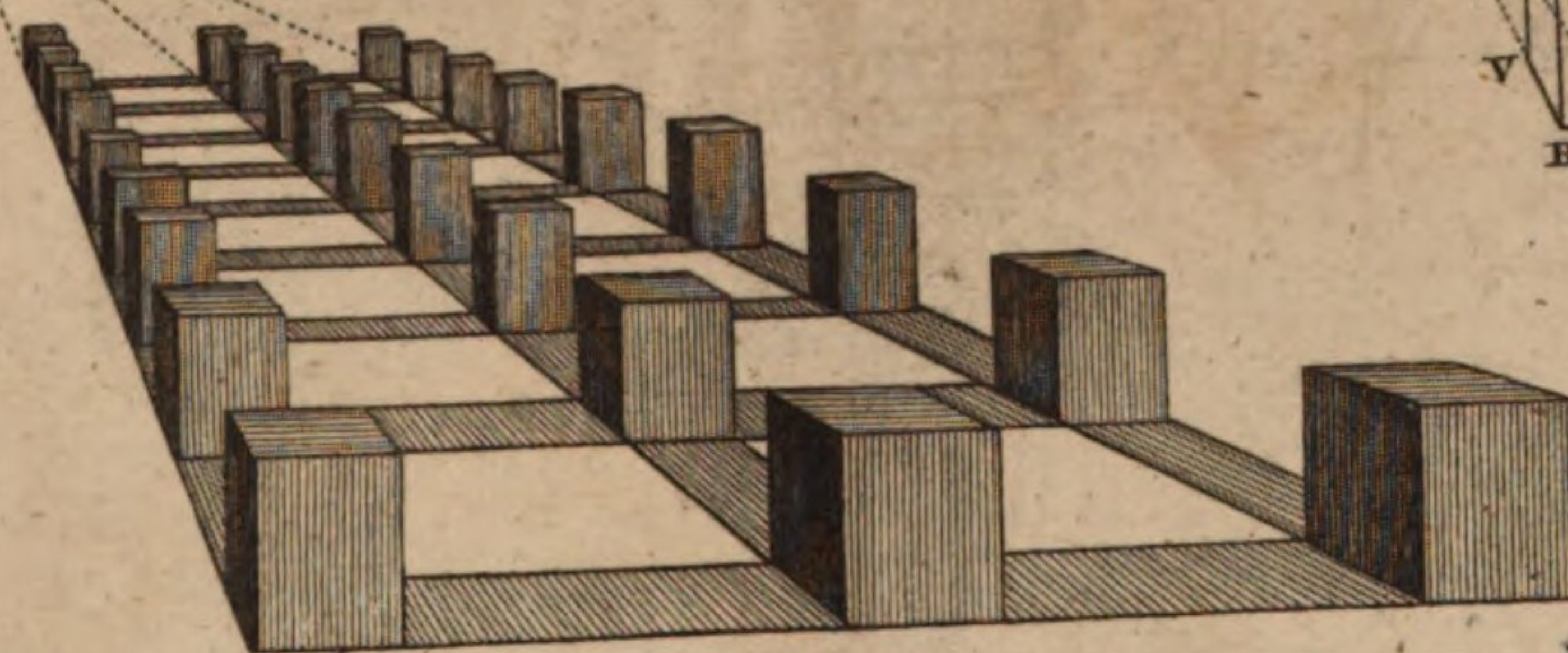


Fig. 7.



Fig. 6.

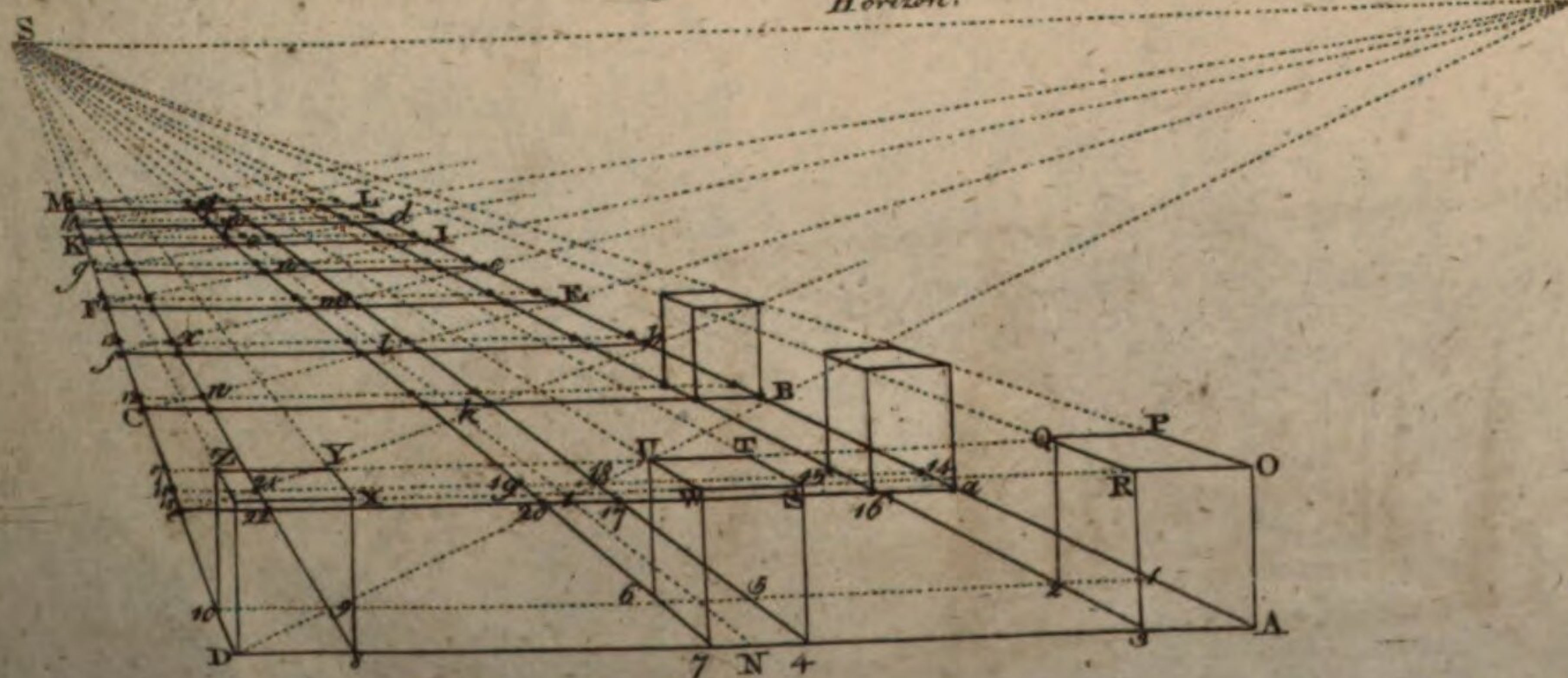
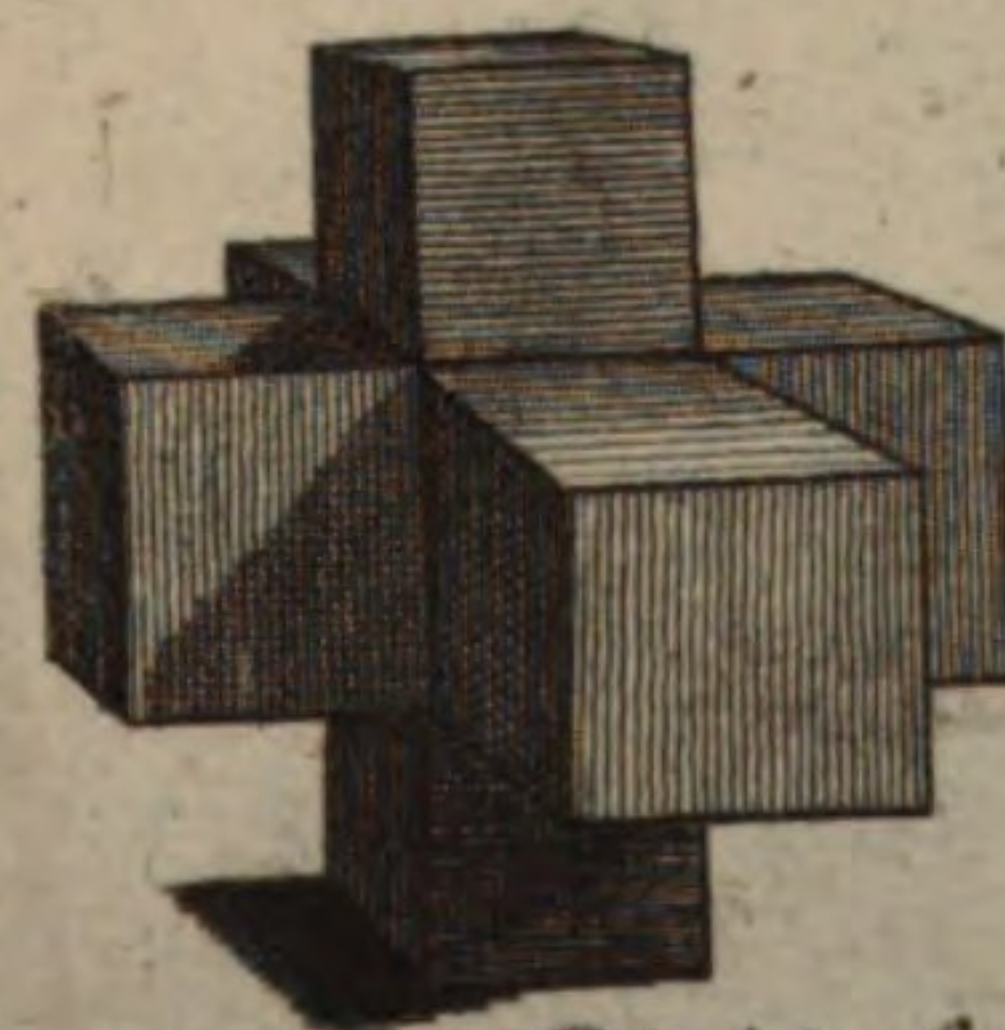


Fig. 4.



A. Belli Pin. Ital. Sculptor fecit.



PERSPECTIVE.

Plate CCCLXXXVI.

Fig. 3.

Fig. 1.

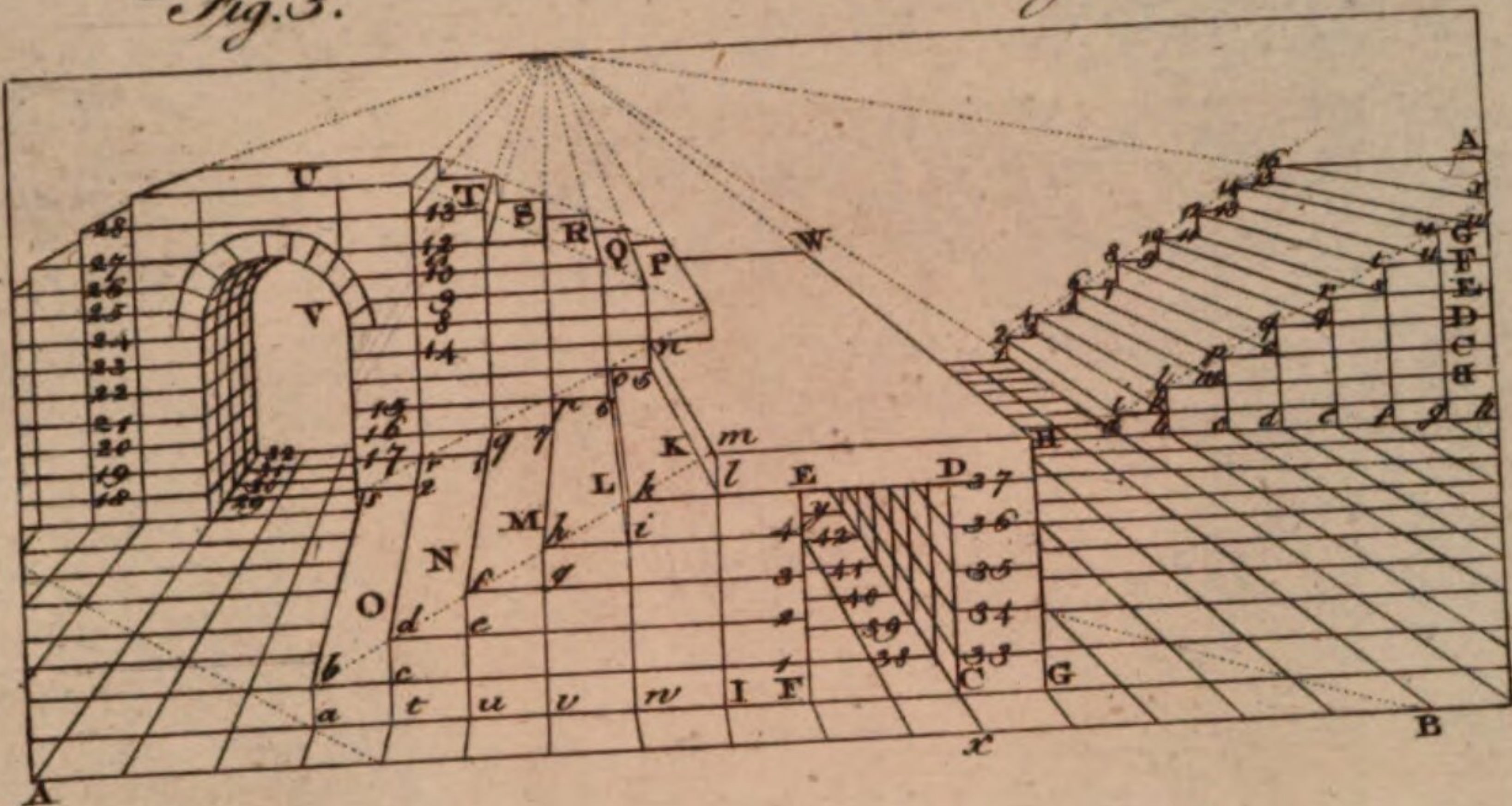
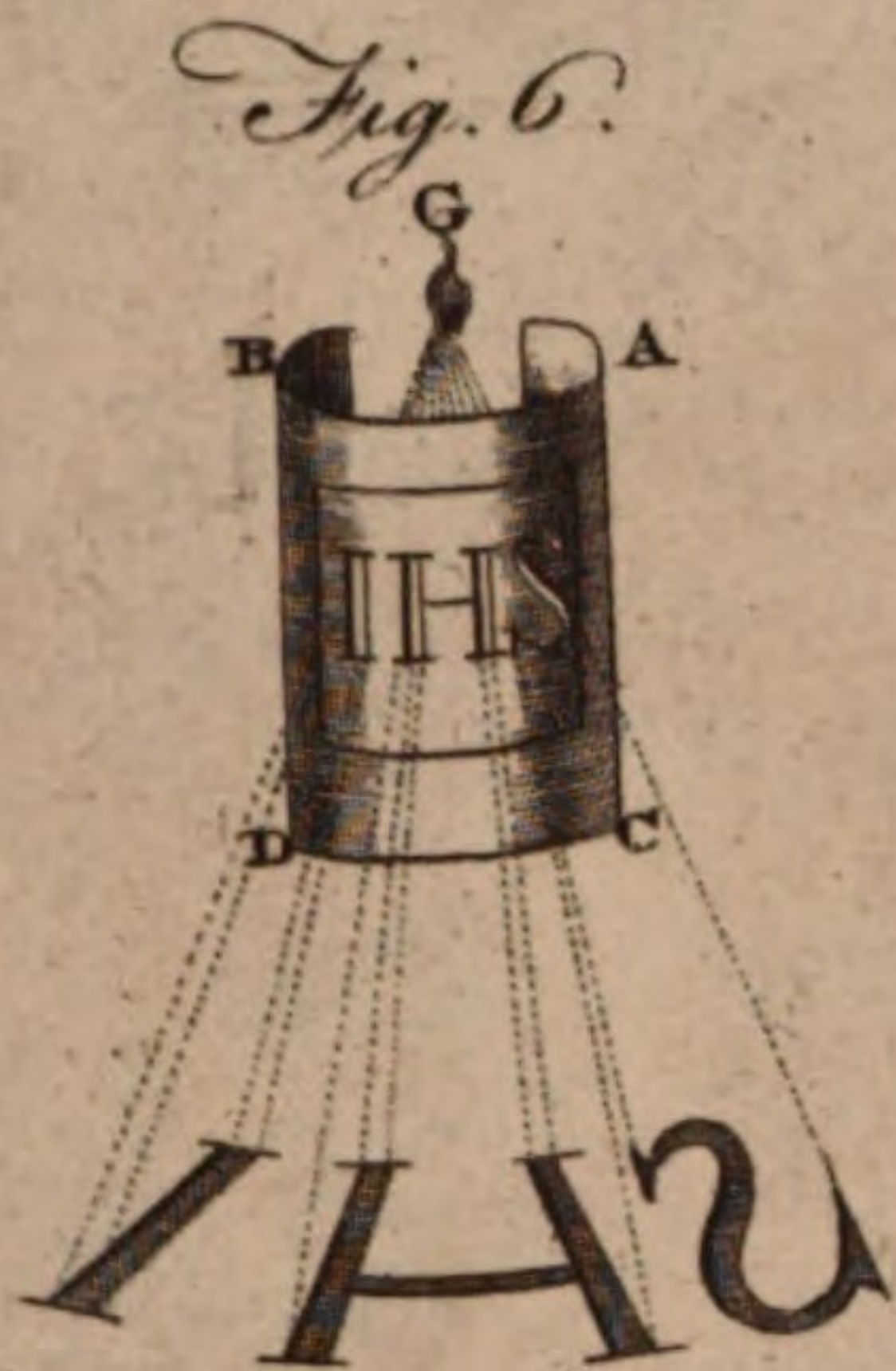


Fig. 4.

Fig. 2.

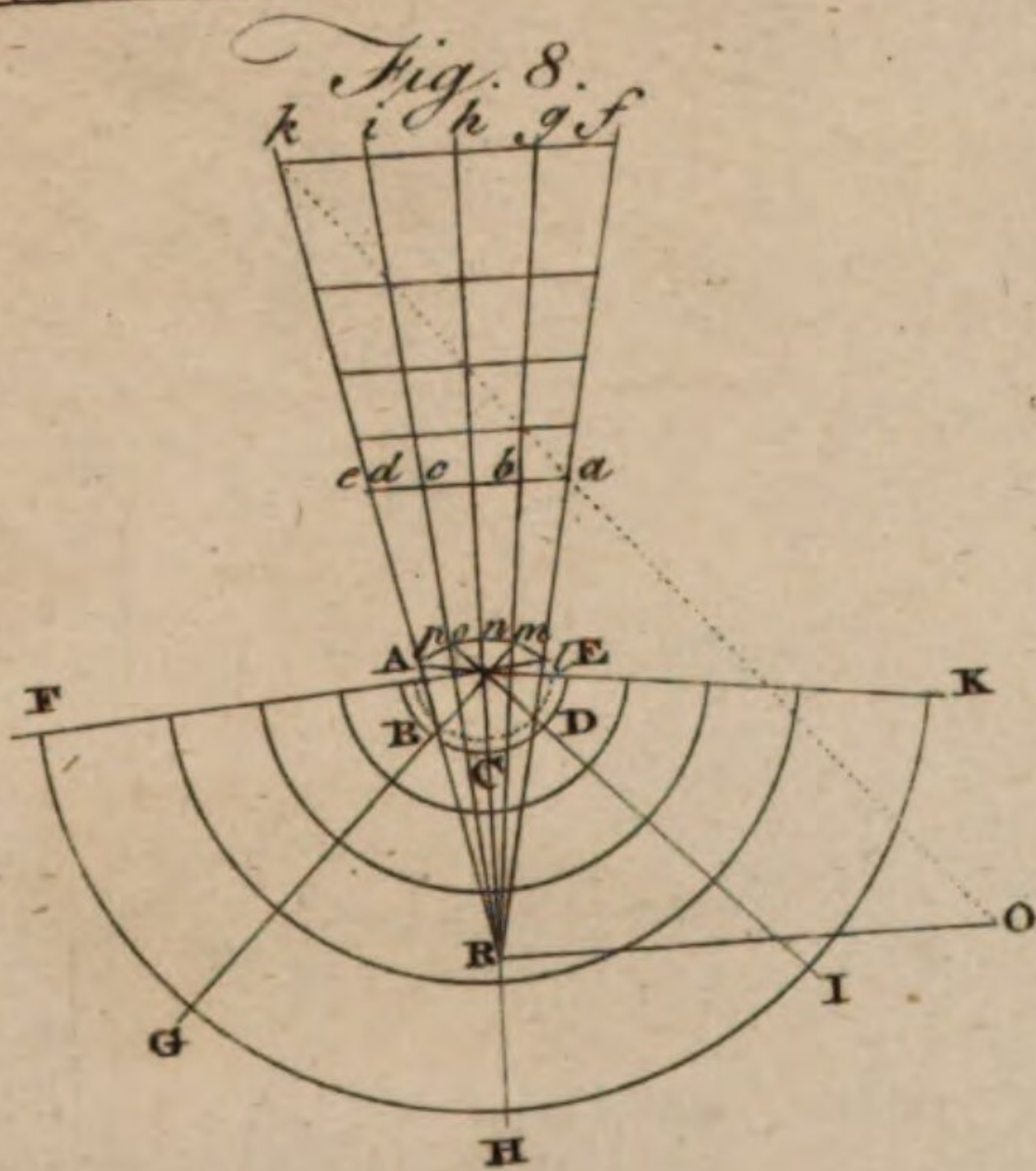
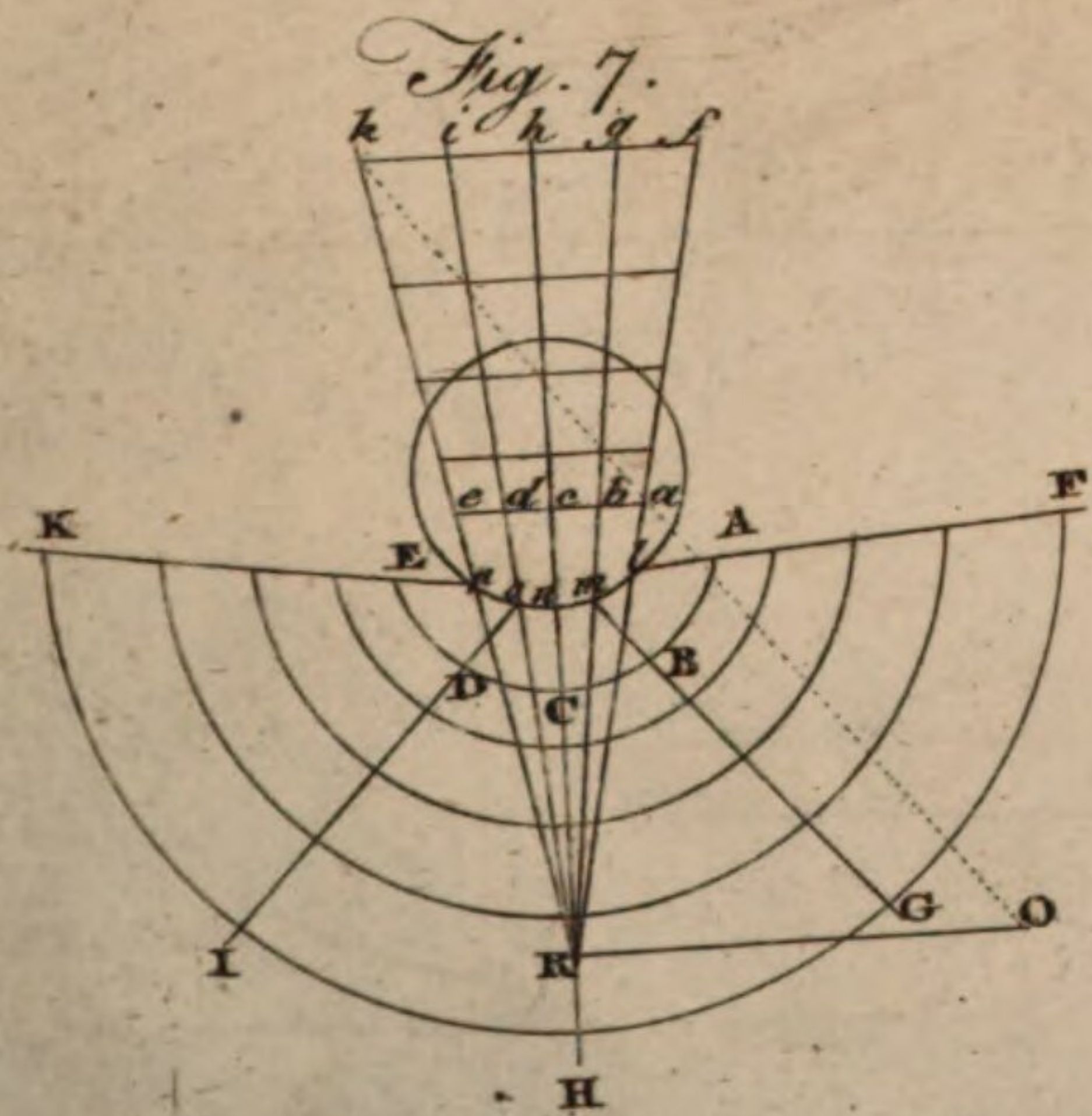
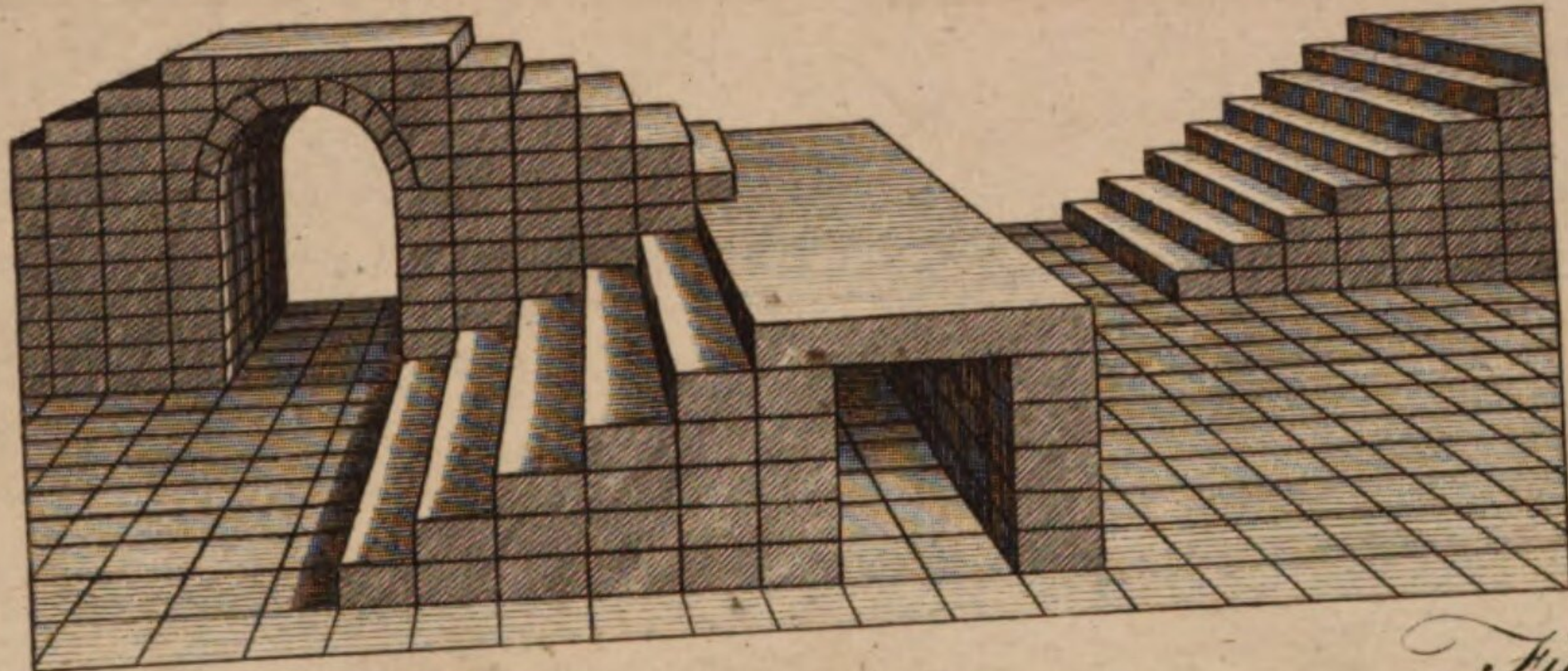
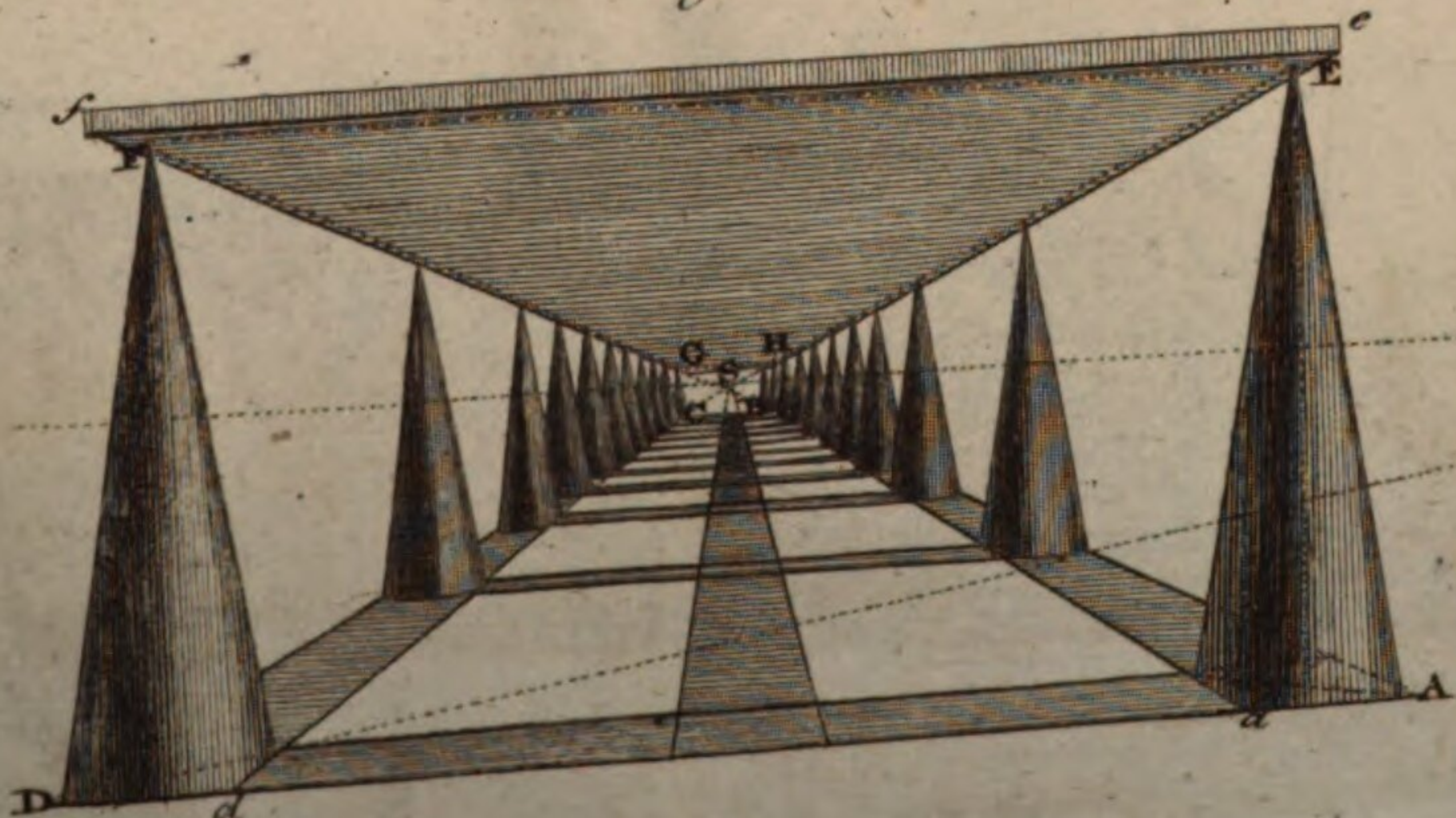


Fig. 5.



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LIBRARY

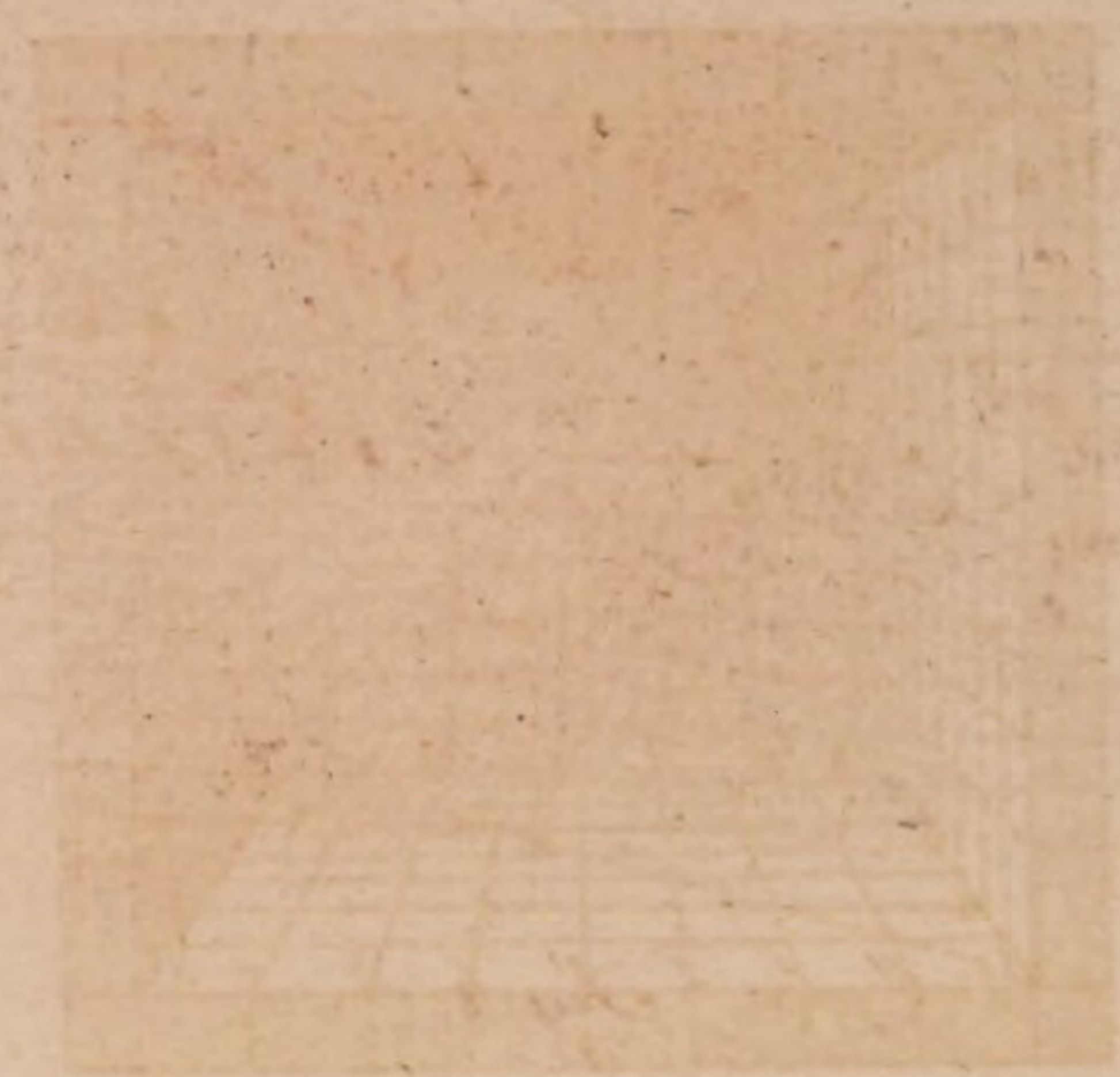


Fig. 2.

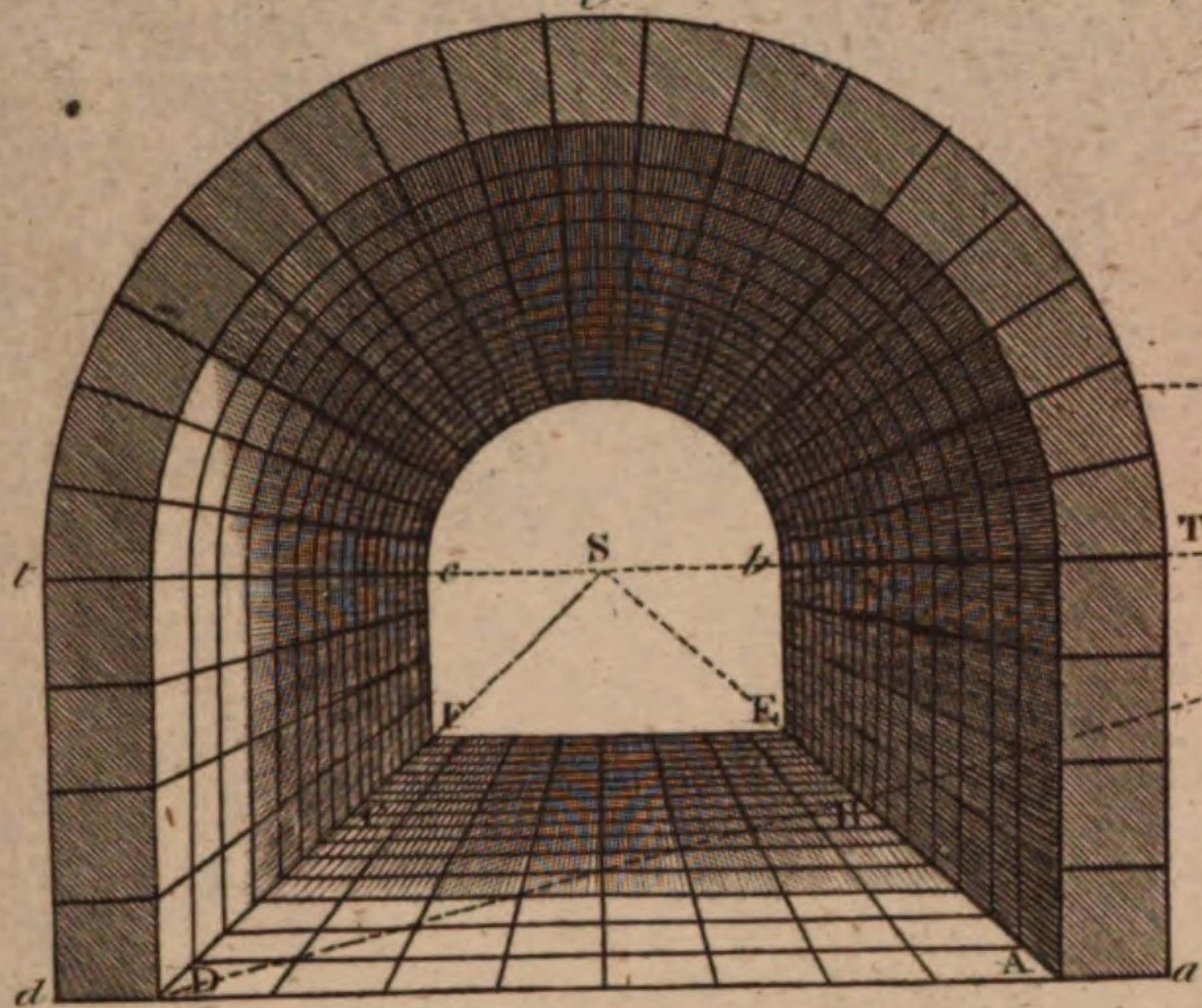


Fig. 1.

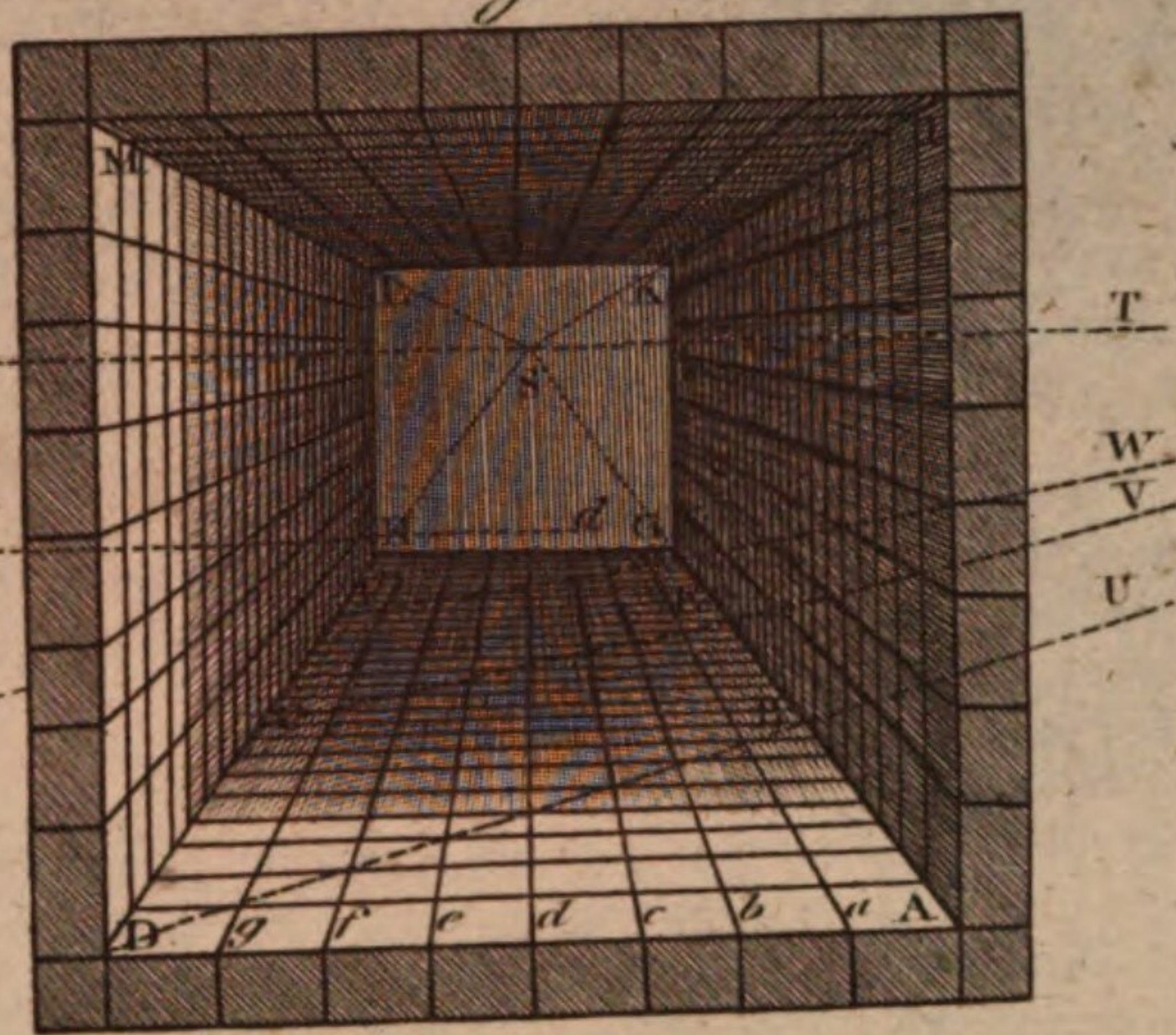


Fig. 3.

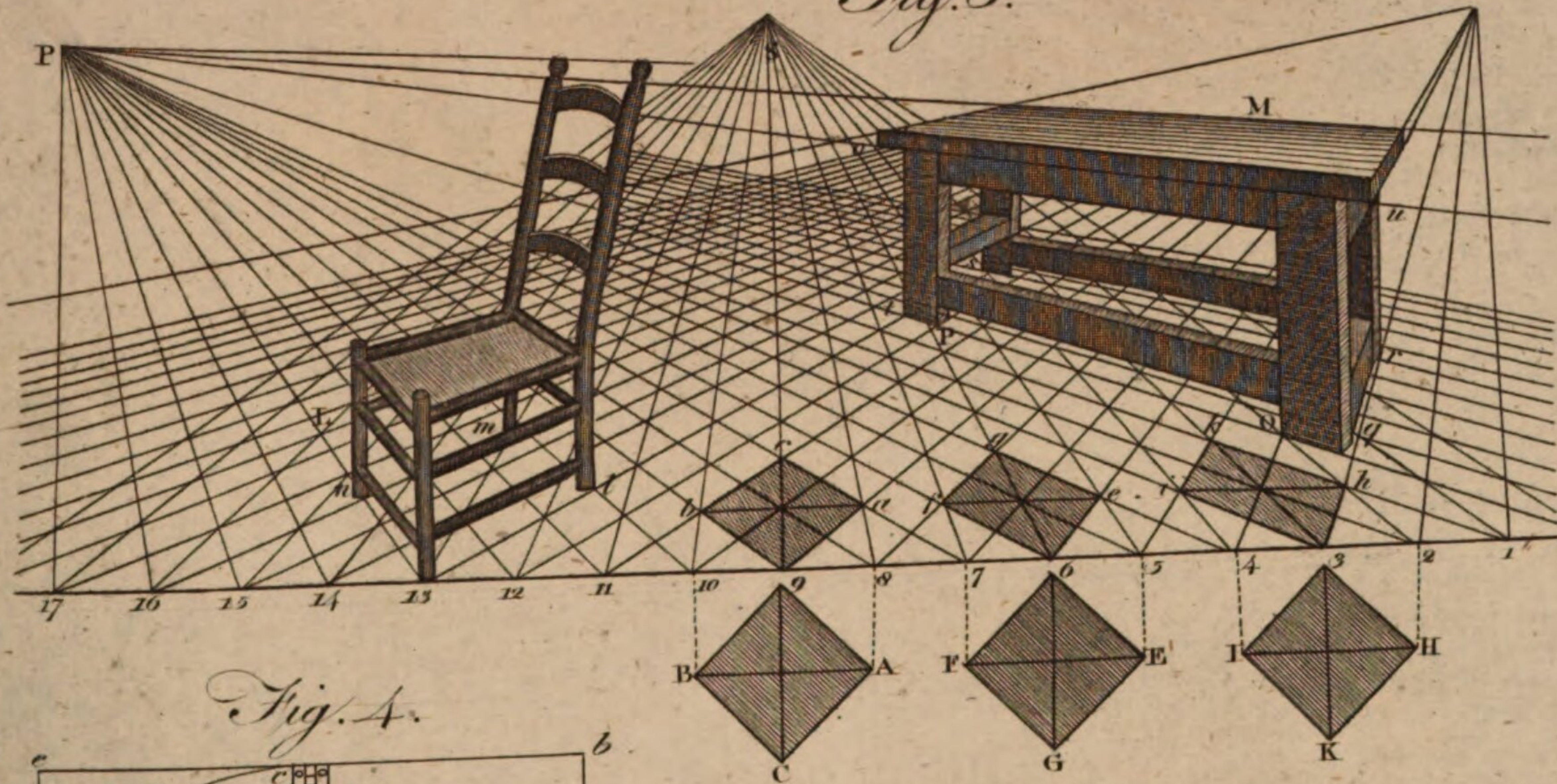


Fig. 4.

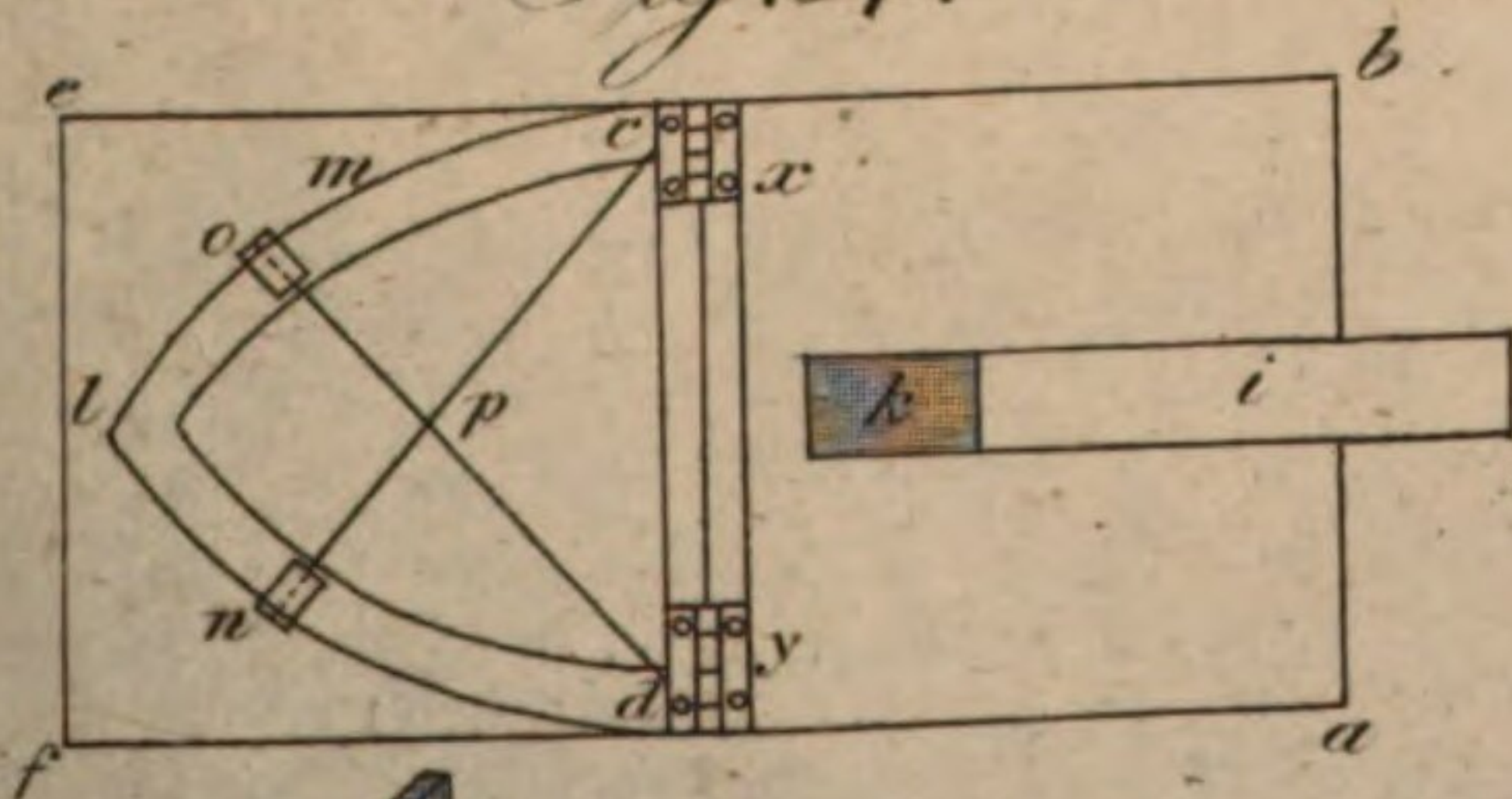
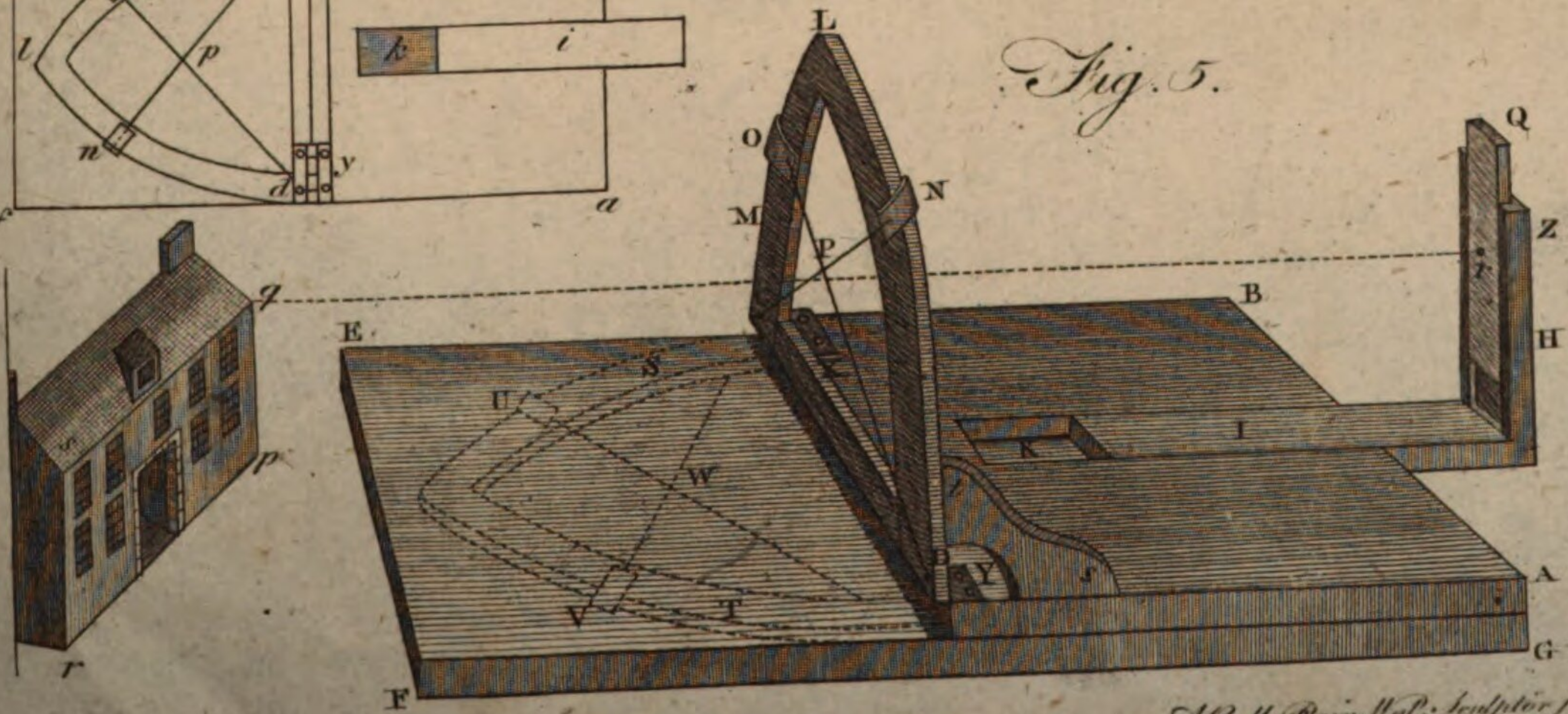


Fig. 5.



Perspec-
tive.

denomination for that which more restrictedly is called *aerial perspective*, or the art of giving a due diminution or degradation to the strength of light, shade, and colours of objects, according to their different distances, the quantity of light which falls upon them, and the medium through which they are seen; the *chiaro oscuro*, or *clair obscure*, which consists in expressing the different degrees of light, shade, and colour of bodies, arising from their own shape, and the position of their parts with respect to the eye and neighbouring objects, whereby their light or colours are affected; and keeping, which is the observance of a due proportion in the general light and colouring of the whole picture, so that no light or colour in one part may be too bright or strong for another. A painter, who would succeed in *aerial perspective*, ought carefully to study the effects which distance, or different degrees or colours of light, have on each particular original colour, to know how its hue or strength is changed in the several circumstances that occur, and to represent it accordingly. As all objects in a picture take their measures in proportion to those placed in the front, so, in *aerial perspective*, the strength of light, and the brightness of the colours of objects close to the picture, must serve as a measure, with respect to which all the same colours at several distances must have a proportional degradation in like circumstances.

Bird's eye view in PERSPECTIVE, is that which supposes the eye to be placed above any building, &c. as in the air at a considerable distance from it. This is applied in drawing the representations of fortifications, when it is necessary not only to exhibit one view as seen from the ground, but so much of the several buildings as the eye can possibly take in at one time from any situation. In order to this, we must suppose the eye to be removed a considerable height above the ground, and to be placed as it were in the air, so as to look down into the building like a bird that is flying. In representations of this kind, the higher the horizontal line is placed, the more of the fortification will be seen, and *vice versa*.

PERSPECTIVE Machine, is an instrument by which any person, without the help of the rules of art, may delineate the true perspective figures of objects. Mr Ferguson has described a machine of this sort of which he ascribes the invention to Dr Bevis.

Fig. 4. of Plate CCCLXXXVII. is a plane of this machine, and fig. 5. is a representation of it when made use of in drawing distant objects in perspective.

In fig. 4. *abef* is an oblong square board, represented by *ABEF* in fig. 5. *x* and *y* (*X* and *Y*) are two hinges on which the part *cdl* (*CLD*) is moveable. This part consists of two arches or portions of circles *cm l* (*CML*) and *dn l* (*DNL*) joined together at the top *l* (*L*), and at bottom to the cross bar *dc* (*DC*), to which one part of each hinge is fixed, and the other part to a flat board, half the length of the board *abef* (*ABEF*), and glued to its uppermost side. The centre of the arch *cm l* is at *d*, and the centre of the arch *dn l* is at *c*.

On the outer side of the arch *dn l* is a sliding piece *n* (much like the nut of the quadrant of altitude belonging to a common globe), which may be moved to any part of the arch between *d* and *l*; and there is such another slider *o* on the arch *cm l*, which may be

set to any part between *c* and *l*.—A thread *c p n* (*CPN*) is stretched tight from the centre *c* (*C*) to the slider *n* (*N*), and such another thread is stretched from the centre *d* (*D*) to the slider *o* (*O*); the ends of the threads being fastened to these centres and sliders.

Now it is plain, that, by moving these sliders on their respective arches, the intersection *p* (*P*) of the threads may be brought to any point of the open space within the arches.—In the groove *k* (*K*) is a straight sliding bar *i* (*I*), which may be drawn further out, or pushed further in at pleasure.

To the outer end of this bar *I* (fig. 5.) is fixed the upright piece *HZ*, in which is a groove for receiving the sliding piece *Q*. In this slider is a small hole *r* for the eye to look through, in using the machine: and there is a long slit in *HZ*, to let the hole *r* be seen through when the eye is placed behind it, at any height of the hole above the level of the bar *I*.

How to delineate the perspective figure of any distant object, or objects, by means of this machine.

Suppose you wanted to delineate a perspective representation of the house *qsrp* (which we must imagine to be a great way off, without the limits of the plate), place the machine on a steady table, with the end *EF* of the horizontal board *ABEF* toward the house, so that, when the Gothic-like arch *DLC* is set upright, the middle part of the open space (about *P*) within it may be even with the house when you place your eye at *Z* and look at the house through the small hole *r*. Then fix the corners of a square piece of paper with four wafers on the surface of that half of the horizontal board which is nearest the house; and all is ready for drawing.

Set the arch upright, as in the figure; which it will be when it comes to the perpendicular side *t* of the upright piece *st* fixed to the horizontal board behind *D*. Then place your eye at *Z*, and look through the hole *r* at any point of the house, as *q*, and move the sliders *N* and *O* till you bring the intersection of the threads at *P* directly between your eye and the point *q*: then put down the arch flat upon the paper on the board, as at *ST*, and the intersection of the threads will be at *W*. Mark the point *W* on the paper with the dot of a black lead pencil, and set the arch upright again as before: then look through the hole *r*, and move the sliders *N* and *O* till the intersection of the threads comes between your eye and any other point of the house, as *p*: then put down the arch again to the paper, and make a pencil mark thereon at the intersection of the threads, and draw a line from that mark to the former one at *W*; which line will be a true perspective representation of the corner *p q* of the house.

Proceed in the same manner, by bringing the intersection of the threads successively between your eye and other points of the outlines of the house, as *r*, *s*, &c. and put down the arch to mark the like points on the paper, at the intersection of the threads: then connect these points by straight lines, which will be the perspective outlines of the house. In like manner find points for the corners of the door and windows, top of the house, chimneys, &c. and draw the finishing lines from point to point: then shade the whole, making the lights and shades as you see them on the house itself, and you will have a true perspective figure of it.—Great care must be taken, during the whole time, that

Perspec-
tive.

Perspec-
tive,
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tion.

the position of the machine be not shifted on the table; and to prevent such an inconvenience, the table should be very strong and steady, and the machine fixed to it either by screws or clamps.

In the same way, a landscape, or any number of objects within the field of view through the arch, may be delineated, by finding a sufficient number of perspective points on the paper, and connecting them by straight or curved lines as they appear to the eye. And as this makes every thing in perspective equally easy, without taking the trouble to learn any of the rules for drawing, the operations must be very pleasing and agreeable. Yet as science is still more so, we would by all means recommend it to our readers to learn the rules for drawing particular objects; and to draw landscapes by the eye, for which, we believe, no perspective rules can be given. And although any thing may be very truly drawn in perspective by means of this machine, it cannot be said that there is the least degree of science in going *that way to work*.

The arch ought to be at least a foot wide at bottom, that the eye at Z may have a large field of view through it: and the eye should then be, at least, $10\frac{1}{2}$ inches from the intersection of the threads at P when the arch is set upright. For if it be nearer, the boundaries of view at the sides near the foot of the arch will subtend an angle at Z of more than 60 degrees, which will not only strain the eye, but will also cause the outermost parts of the drawing to have a disagreeable appearance.—To avoid this, it will be proper to draw back the sliding bar I, till Z be $14\frac{1}{2}$ inches distant from P; and then the whole field of view, through the foot wide arch, will not subtend an angle to the eye at Z of more than 45 degrees; which will give a more easy and pleasant view, not only of all the objects themselves, but also of their representations on the paper whereon they are delineated. So that, whatever the width of the arch be, the distance of the eye from it should be in this proportion: As 12 is to the width of the arch, so is $14\frac{1}{2}$ to the distance of the eye (at Z) from it.

If a pane of glass, laid over with gum water, be fixed into the arch, and set upright when dry, a person who looks through the hole *r* may delineate the objects upon the glass which he sees at a distance through and beyond it, and then transfer the delineation to a paper put upon the glass, as mentioned in the beginning of the article PERSPECTIVE.

Mr Peacock likewise invented three simple instruments for drawing architecture and machinery in perspective, of which the reader will find sketches and descriptions in the 75th volume of the Philosophical Transactions. We do not insert these descriptions here, because we do not think the instruments superior to that described by Ferguson, and because we wish that our readers who have occasion to *draw* may make themselves so much masters of the art of perspective, as to be above the aid of such mechanical contrivances.

PERSPECTIVE Glass, or Graphical Perspective. See DIOPTRICS.

PERSPIRATION, in medicine, the evacuation of the juices of the body through the pores of the skin. Perspiration is distinguished into sensible and insensible; and here sensible perspiration is the same

with sweating, and insensible perspiration that which escapes the notice of the senses; and this last is the idea affixed to the word *perspiration* when used alone.

PERSPICUITY, properly signifies the property which any thing has of being easily seen through; hence it is generally applied to such writings or discourses as are easily understood.

PERSPICUITY, in composition. See ORATORY. n^o 43.

PERTH, a county of Scotland, including Menteith, Braidalbin, Athol, Stratherne, part of Gowrie, and Perth Proper; is bounded by Badenoch and Lochaber on the north and north-west; by Marr on the north-east; by Argyle and Lennox on the west and south-west; having Clackmannanshire, part of Stirlingshire, and the Forth to the south; the shires of Kinross and Fife to the south-east, and Angus to the east. It extends above 70 miles in length, and near 60 at its greatest breadth, exhibiting a variety of Highlands and Lowlands; mountains, hills, dales, and straths, diversified with pasture grounds, corn-fields, and meadows; rivers, lakes, forests, woods, plantations, inclosures, towns, villages, and a great number of elegant seats, beautifully situated, belonging to noblemen and gentlemen. The chief rivers of Perthshire are the Tay, the Teith, and the Erne, besides a great number of subordinate streams. The river Teith is famous for its salmon-fishery, and its steep cataract, near the Blair of Drummond, the noise of which is so loud, as to deafen those who approach it. The river Erne rises from Loch Erne, a lake seven miles long, in the mountainous country of Stratherne: this river, after a course of 34 miles from west to east, during which it receives many streams and rivulets, falls into the Tay at Abernethy.

Freestone, lead, iron, and copper ores, with some lapis calaminaris, are found in different parts of Perthshire. The soil, being generally rich and well manured, produces excellent wheat, and all kinds of grain. The hilly country abounds with pasture for the black cattle, horses, sheep, goats, and deer. The heaths, woods, and forests, are stored with variety of game; the rivers teem with salmon and trout; the gardens and orchards are stored with all kinds of herbs, roots, apples, pears, cherries, plums, and almost every species of fruit found in South Britain. The houses and attire, even of the commonalty, are neat and decent; and every peasant can produce a good quantity of linen, and great store of blankets, made in his own family. Indeed, this is the case through all the Lowlands of Scotland. Flax is reared by every husbandman; and being dressed at home, is spun by the females of his family into thread for linen; this is woven by country weavers, of whom there is a great number through all the Low Country, and afterwards bleached or whitened by the good-wife and her servants; so that the whole is made fit for use at a very small expence. They likewise wash, card, spin, and weave their wool into tartan for plaids, kerfies, and coarse russet-cloth, for common wearing, besides great part of it which is knit into caps, stockings, and mitts. Plaids, made of the finest worsted, are worn either plain or variegated, as veils, by women of the lower, and even of the middle rank; nay, some years ago, ladies of fashion wore silken plaids with an undress: this

Perth. this is a loose piece of drapery, gathered about the head, shoulders, and waist, on which it is crossed, so as to leave the hands at liberty, and produces a very good effect to the eye of the spectator. The Lowlanders of Perthshire are civilized, hospitable, and industrious: the commerce of the country consists chiefly in corn, linen, and black cattle: there are, moreover, some merchants who trade to foreign countries.—For an account of the different divisions of this county above-mentioned, see the articles as they occur in the order of the alphabet.

PERTH Proper, stretching 20 miles in length, and at some places 15 in breadth, is bounded on the north east, by the Carse of Gowrie; on the east, by Angus; on the west, by Stratherne; on the north, by Athol; and on the south, by the Frith of Tay. This is likewise a fruitful country, populous and well cultivated, abounding with gentlemen who possess opulent estates; with farmers who understand agriculture; and with manufacturers who turn their industry to great account. North eastward from Perth to Brechin lies the vale of Strathmore, one of the most fertile districts in Scotland, which gives the title of *Earl* to the noble family of Lyon.

PERTH, the capital of the county of that name, is an agreeable, populous town, situated 20 miles within land, on the south bank of the river Tay. It was otherwise called *St Johnston's*, from a church dedicated to St John, as the patron of the place. It is a royal borough, second in dignity to the metropolis, the seat of a large presbytery, and gave the title of *Earl* to the family of Drummond, which is now forfeited. James Drummond, 4th earl, was created duke of Perth by James II. for adhering to whose interests he was outlawed. His two grandsons were attainted in 1745. No less than 14 national councils have been held at Perth between 1201 and 1459. But the oldest was at Scone, A. D. 906. Perth, in the reign of Edward I. of England, was possessed by the English, who secured it with fortifications: but after an obstinate resistance, they were expelled by Robert Bruce. In the year 1715, the rebels made it a place of arms, and retired to it, after the battle of Dunblane; but they were in a little time dislodged by the duke of Argyll, and retreated northwards with the pretender. They possessed it also in 1745. The pretender was proclaimed king, new magistrates were appointed, and an attempt was made to fortify it. The town is populous and handsome; the streets are well paved, and tolerably clean at all times; and the houses, though not stately, make a very decent appearance. Both the streets and houses are, for the greater part, disposed in a regularity of plan, which proves them not to be of the most remote antiquity. It is indeed true, that the level situation, being singularly favourable to regularity, might, even from the first, give this an advantage over many of our old boroughs. Several streets run in a direction parallel with the river, as far as a right can bear this relation to a curve line, nearly between east and west: these are again intersected by others extending between north and south. It should seem that anciently particular streets were inhabited, each by a particular class of artisans. The names still preserved seem to indicate as much. The shop-keepers or merchants occupied one street; the hammermen a

second; and other crafts occupied, in the same manner, each a separate street. Many of the houses in that street called the *Water-Gate*, seem to be very old buildings. Towards the southern end of the Water-Gate stands the famous palace of the Gowrie family. The house, and the very room, where the attempt of the Gowries to seize or assassinate the king was supposed to have been made, is now converted into barracks for a train of artillery; but the back-stair, down which the Ruthvens were thrown, is pulled down. This strange event, however magnified or attested by contemporary writers, is made up of so many improbabilities, or circumstances for which no reason can be assigned, that Sir David Dalrymple, in republishing the account printed by authority, 1600, preparatory to his further observations on it, seems justified in absolutely discrediting a fact which passed for problematical with so many persons at the very time. Dr Robertson supposes it a plot of Elizabeth to get James into her power. Mr Cant having discussed the whole story of the conspiracy in his *Muse's Threnodie*, p. 18.—261, concludes, "that as this would have been a very impolitic measure, the best way of accounting for it is by James's known hatred to the Puritans, and wish to get rid of two popular characters." The king had been seized and forced from his favourites by the father of the Ruthvens 12 years before (1582), and though he affected to forgive him, took the first opportunity to condemn and execute him as a traitor, 1584. Mr Camden was too good a courtier to speak with impartiality of any part of this weak monarch's conduct. Though the name of *Gowrie* was abolished, the title of *Ruthven* was revived in the person of Sir Thomas Ruthven of Freeland, whom Charles II. 1651, created Lord Ruthven: but the honour, on the death of his son David in 1704, devolved on Isabel surviving daughter of his second sister, who married Sir Francis Ruthven, and was succeeded, 1732, by his son James.

The castle of Perth stood near the red bridge, which terminated the narrow street called *Skinner gate*. At the end of the Castle-street another narrow street leads west to the Black-friars called *Couvre-feu row*, where the curfew bell was. The kings of Scotland before James II. were crowned at Scone, and resided at Perth as the metropolis of the nation. James resided and was educated in the castle of Edinburgh, and was crowned there 1437. The parliaments and courts of justice were removed from Perth to Edinburgh, but Perth kept its priority till 22 James III. 1482.

The church in which John Knox harangued is still standing, and is now divided into three; named the *east*, the *middle*, and the *west* kirks. The east kirk was lately very handsomely modernised within. There is an old hospital, a considerable building, the founding of which is ascribed to James VI. The town-house shuts up the eastern end of the High-street. A monastery of Carthusians was here established by King James I. of Scotland, who lost his life on the very spot, by the treachery of Athol and his accomplices. The king was buried in a very stately monument in this place, which was called *monasterium callis virtutis*, one of the most magnificent buildings in the kingdom, which with the rest was destroyed by the populace. James VI. created George Hay commendator

Perth.

tor of the Carthusian priory, giving him all its emoluments, with a vote and seat in parliament; but these not being sufficient to support the title, he surrendered it back to the king. The only remains of this magnificent structure is to be seen in the carved stones with which the south-east porch of St John's church is built, now greatly decayed. The king's garment full of stabs was preserved here after the reformation.

The town was anciently provided with a stone-bridge over the river, which an inundation swept away; but a new and very fine one has lately been built, the most beautiful structure of the kind in North Britain, and was designed and executed by Mr Smeaton. Its length is 900 feet; the breadth (the only blemish) 22 within the parapets. The piers are founded 10 feet beneath the bed of the river, upon oaken and beechen piles, and the stones laid in puzzalane, and cramped with iron. There are nine arches, of which the centre is 75 feet in diameter. This noble work opens a communication with all the different great roads of the kingdom, and was completed at the expence of 26,000*l*. Of this the commissioners of forfeited estates, by his majesty's permission, gave 11,000*l*. Perth 2000*l*. private subscribers 4756*l*. the royal boroughs 500*l*. But still this great work would have met with a check for want of money, had not the earl of Kinnoul, with his characteristic public spirit, advanced the remaining sum, and taken the security of the tolls, with the hazard only to himself. The whole expence has now been defrayed, and the toll has ceased.

Heron's

Tour, 1792.

"The Tay (says a late traveller), over which this bridge is thrown, and on the southern bank of which the city of Perth stands, is truly a noble river. It rises in Braidalbin, on the frontiers of Lorne. Before it has advanced many miles from its source, its stream is considerably augmented by the accession of several small rills. Soon after, it diffuses its waters into a small lake called Loch Dochart; and indeed the river itself there bears rather the name of the Dochart. Continuing its course from Loch Dochart, it soon again expands into another lake. Out of this it proceeds to Killin, still bearing, if I remember right, the name of the Dochart. Here it meets with another river which flows hither by a more north-easterly course. The waters are diffused into the famous Loch Tay, 16 miles in length. Issuing from this spacious lake at Kenmore, the Tay is soon after increased by the accession of the Lyon. It proceeds onward in an eastern direction through Athol, receiving as it advances all the waters in the country, till at Logierait it is joined by the large river of Tummel. Here it bends to the south, and advancing about 8 miles reaches Dunkeld; whence taking a more northern direction, it continues its course towards Perth; being as it advances still augmented by the accession of various tributary streams, the most considerable of which is the Almond. At Perth it turns to the south-east, and receiving as it proceeds the waters of the Erne, passes by Abernethy, once the capital of the Pictish kingdom. Soon after this, it expands itself to the breadth of three miles. Contracting its breadth, as it approaches Dundee, it there opens into the German ocean.

"Such is the noble river; on the southern bank of which, where it has increased into a vast body of water, and not a great many miles above where it dis-

charges itself into the ocean, Perth is advantageously situated. A person acquainted with the general character of great rivers, and with their influence in determining the aspect and the fertility of the districts thro' which they pass, might readily, without farther knowledge of the local circumstances than what is conveyed in this account of the course of the Tay, and of the situation of Perth upon it, conclude the city to stand amid delightful scenery, and to enjoy most of the advantages which natural circumstances afford, for the promotion of trade and industry."

This town has but one parish, which has two churches, besides meetings for separatists, who are very numerous. One church, which belonged to a monastery, is very ancient: not a vestige of the last is now to be seen; for the disciples of Knox made a general desolation of every edifice that had given shelter to the worshippers of the church of Rome: it being one of his maxims, to pull down the nests, and then the rooks would fly away.

The flourishing state of Perth is owing to two accidents: the first, that of numbers of Cromwell's wounded officers and soldiers choosing to reside here, after he left the kingdom, who introduced a spirit of industry among the people; the other cause was the long continuance of the earl of Marr's army here in 1715, which occasioned vast sums of money being spent in the place. But this town, as well as all Scotland, dates its prosperity from the year 1745; the government of this part of Great Britain having never been settled till a little after that time.

That this town does not owe its origin to William I. 1210, as Boethius says, is evident from its being mentioned as a considerable place in the foundation charter of Holyroodhouse by David I. 1128.

The trade of Perth is considerable. It exports annually 150,000*l*. worth of linen, from 24,000 to 30,000 bolls of wheat and barley to London and Edinburgh, and a very large quantity of cured salmon. That fish is taken there in vast abundance; 3000 have been caught in one morning; weighing, one with another, 16 pounds; the whole capture 48,000 pounds. The fishery begins on St Andrew's day, and ends August 26th old style. The rents of the fisheries amount to considerably upwards of 3000*l*. per annum. Smelts come up this river in May and June. See PEARLS. W. Long. 3. 27. N. Lat. 56. 22.

PERTH Amboy. See New JERSEY.

PERTINAX, was an illustrious Roman emperor after the death of Commodus. He was descended of a mean family; and like his father, who was either a slave or the son of a manumitted slave, he for some time followed the employment of drying wood and making charcoal. His poverty did not, however, prevent him from receiving a liberal education. For some time he was employed in teaching a number of pupils the Greek and the Roman languages in Etruria. He left this laborious profession and became a soldier, and by his valour and intrepidity gradually rose to offices of the highest trust in the army, and was made consul by M. Aurelius for his services. He was afterwards entrusted with the government of Mœsia, and at length he presided over the city of Rome as governor. When Commodus was murdered, Pertinax was universally chosen to succeed to the imperial dignity;

Perth,
Pertinax.

Pertinax. nity; and his refusal, on the plea of old age and increasing infirmities, did not prevent his being saluted emperor and Augustus. He complied with reluctance; but his mildness, his economy, and popularity, convinced the senate and the people of the prudence and the justice of their choice. He forbade his name to be inscribed on such places or estates as were part of the imperial domains, and asserted that they belonged not to him but to the public. He melted all the silver statues which had been raised to his predecessor, and he exposed to sale all his concubines, horses, arms, and all the instruments of his pleasure and extravagance. With the money raised from these relics he enriched the empire, and was enabled to abolish all the taxes which Commodus had laid on the rivers, ports, and highways, through the empire. These patriotic actions gained him the affection of the worthiest and most discerning of his subjects; but the extravagant, luxurious, and vicious, raised their clamours against him; and when the emperor attempted to introduce among the prætorian guards such discipline as was absolutely necessary to preserve the peace and tranquillity of Rome, the flames of rebellion were kindled, and the minds of the soldiers totally alienated. Pertinax was apprized of their mutinying, but he refused to fly at the hour of danger. He scorned the advice of such of his friends as wished him to withdraw from the impending storm; and he unexpectedly appeared before the seditious troops, and without fear or concern boldly asked them, whether they who were bound by duty to defend the person of their prince and emperor, were come to betray him and to shed his blood? His undaunted courage and intrepidity would have had the desired effect, and the soldiers had begun to retire, when one of the most seditious of them advanced and darted his javelin at the emperor's breast, exclaiming, *The soldiers send you this.* The rest instantly followed the example; and Pertinax, muffling up his head, and calling upon Jupiter to avenge his death, remained unmoved, and was immediately dispatched. His head was cut off and carried upon the point of a spear in triumph to the camp. This abominable murder happened in the 103d year of the Christian era.

It was no sooner known that Pertinax had been murdered, than the enraged populace flocked from all quarters of the city; and uttering dreadful menaces against the authors of his death, ran up and down the streets in quest of them. The senators were no less concerned for his death than the people; the more, because they were now convinced, that the soldiers would suffer none to reign but tyrants. However, as they had more to lose than the common people, they did not offer to revenge his death; but either shut themselves up in their own houses, or in those of the soldiers of their acquaintance, thinking themselves there most safe. Such was the unfortunate and much-lamented end of Publius Helvius Pertinax, after he had lived 66 years 7 months and 26 or 28 days; and reigned, according to Dio Cassius, 87 days, that is, from the 1st of January to the 28th of March. His body, together with his head, was interred with great pomp by Didius Julianus, his successor, in the burying place of his wife's family. The emperor Septimius Severus, with the title of emperor, assumed the name of Pertinax, which he knew would above any thing

else recommend him to the army in Illyricum, and to the Roman people. He punished with great severity all those who had been accessory to his death, disbanded the prætorian guards, honoured his memory with a most magnificent funeral, at which was carried the effigies of the deceased prince, pronounced his panegyric, and caused him to be ranked in the number of the gods, appointing the son chief priest to his father. The day of his accession to the empire was yearly celebrated with the Circensian games; and his birthday, for many years after, with other sports. He performed great things, says Herodian, during his short administration, and would have restored the empire to its former lustre, had he been indulged with a longer reign.

PERTINENT OF LANDS, in Scots law. See **LAW**, N° clxvii. 6. p. 670.

PERU, a country of South America, is bounded on the north by Popayan, on the east by Amazonia, on the south by Chili, and on the west by the Pacific ocean; extending from 1° 40' north to 26° 10' south latitude, and between 56° and 81° west longitude from Greenwich; being about 1800 miles in length, but its greatest breadth does not much exceed 390.

This country was discovered by the Spaniards; and the first intelligence they had of it was on the following occasion. Nunez de Balboa having been raised to the government of the small colony at Santa Maria in Darien by the suffrages of his companions, was very desirous of having that authority confirmed by the court of Spain. For this purpose he endeavoured to recommend himself to the Spanish ministry by some important service; that is, by extorting from the Indians as much gold and silver as he could. He therefore made frequent inroads into the adjacent country, subdued several of the caciques or petty princes, and collected a considerable quantity of gold. In one of these expeditions, the Spaniards contended so violently about the division of some gold which they had taken, that they were on the point of coming to blows with one another. A young cacique who was present, astonished at such contention about a thing of which he knew not the use, tumbled the gold out of the balance with indignation, and turning to the Spaniards, told them, that since they valued gold so very highly, he would conduct them to a country where the most common utensils were made of that metal. The Spaniards eagerly caught at this hint; and upon further questioning the cacique, were informed, that at the distance of six days journey, towards the south, from the place where they were at that time, they should discover another ocean, near which this desirable country was situated; but if they intended to attack that powerful state, they must assemble a much greater number of forces than had hitherto appeared on the continent.

Balboa was transported at the news. He immediately concluded, that the ocean mentioned by the cacique was that which Columbus had so long sought for in vain, and that the rich territory described to him must be part of the East Indies. He was therefore impatient till he should arrive at that happy country, in comparison with the discovery of which all former exploits almost vanished into nothing. In order therefore to procure a force sufficient to ensure success

Pertinent,
Peru.

^r How discovered by the Spaniards.

Peru.

in his enterprise, he first secured the friendship of the neighbouring caciques, and then dispatched some of his officers to Hispaniola, with a large quantity of gold as a proof of his past success, and an earnest of what he expected. By this means he secured the friendship of the governor, and procured a considerable reinforcement. But though he now imagined himself sufficiently strong to attempt the discovery, there were still prodigious difficulties to be surmounted.

2
Difficulties they had to overcome.

The isthmus of Darien, though not above 60 miles in breadth, has a chain of lofty mountains running through its whole extent. Being situated between two vast oceans, the Atlantic and Pacific, the climate is excessively moist, inasmuch that it rains for two-thirds of the year. In consequence of this the valleys are marshy, and so frequently overflowed, that the inhabitants find it necessary in some places to build their houses upon trees, in order to be elevated at some distance from the damp soil, and the odious reptiles engendered in the waters. There are also many large rivers very difficult to be crossed; and as the country at that time was only inhabited by a few wandering savages, the enterprise of Balboa was looked upon as the most difficult that had been undertaken by any Spanish adventurer.

On this arduous task Balboa set out on the 1st day of September 1513, about the time that the periodical rains began to abate. He had only 190 Spaniards along with him; but all of them were hardy veterans, inured to the climate of America, and very much attached to their leader. A thousand Indians attended in order to carry their provisions and other necessaries; and they had along with them some of those fierce dogs so terrible to the natives of America.

Balboa proceeded by sea, and without difficulty, to the territories of a cacique whose friendship he had gained; but as soon as he began to advance into the interior parts of the country, he met with all the difficulties above-mentioned. Some of the caciques also, at his approach, fled with all their people to the mountains, carrying off or destroying whatever could afford subsistence to an army. Others collected their force in order to oppose him: however, Balboa continued unmoved in spite of all difficulties; and at last, after a most painful journey of 25 days, he arrived at the South Sea; when, with the most extravagant transports of joy, he went into it up to the middle, and took possession of the ocean in his master's name, vowing to defend it against all the enemies of Spain.

3
Balboa first gets a sight of the South Sea.

That part of the South Sea which Balboa now discovered, he called the *Gulf of St Michael*; which name it still retains, and is situated to the east of Panama. From some of the neighbouring caciques he extorted provisions and gold by force; others sent him presents voluntarily; and he had the satisfaction to hear, that the adjacent coasts abounded with pearl-oysters. The inhabitants were also unanimous in declaring, that there was to the southward a very rich and populous country, where the people had tame animals, which they endeavoured to describe to him, meaning the Peruvian sheep. But, however impatient he might be to visit this empire, he considered it as highly improper to venture thither with a handful of men exhausted by labour and disease. He therefore led back his followers to Santa Maria, in order to refresh them

after their fatigues; and from thence he sent an account to the court of Spain of the important discovery he had made, demanding a reinforcement of 1000 men, in order to conquer the country he had newly discovered. But here his hopes were all blasted at once. The king indeed determined to prosecute the discovery, but refused to continue Balboa in his government, appointing Pedrarias Davila to supersede him, and giving him the command of 15 stout vessels, with 1200 soldiers, to ensure his success.

Peru.

4
He is deprived his command.

Balboa, though much mortified by his disgrace, submitted to the king's pleasure without repining. It was not long, however, before he met with an additional misfortune; the new governor tried him for some pretended irregularities committed before his arrival, and fined him of almost all he was worth. In the mean time the Spaniards, paying no regard to the treaties concluded by Balboa with the Indians, plundered and destroyed all indiscriminately, inasmuch that the whole country, from the gulph of Darien to the lake Nicaragua, was desolated. The new comers had also arrived at the most unlucky time of the year, namely, about the middle of the wet season, when the excessive rains produced the most violent and fatal diseases. To this was joined an extreme scarcity of provisions; so that in the space of a month above 600 Spaniards perished in the utmost misery.

Balboa failed not to send violent remonstrances to Spain against the conduct of the new governor; and he, on the other hand, accused his antagonist of having deceived the king by false accounts of the country, and magnifying his own exploits beyond measure. At last the king, sensible of his error in superseding Balboa, appointed him adelantado, or lieutenant-governor of the countries on the South Sea, with very extensive privileges and authority; enjoining Pedrarias to support him in all his enterprises, and to consult with him in every thing which he himself undertook. It was impossible, however, to extinguish the envy of Pedrarias; and therefore, though a reconciliation took place in appearance, even so far, that Pedrarias agreed to give his daughter in marriage to Balboa, yet he soon after had him condemned and executed on pretence of disloyalty, and an intention to revolt from the king. And put to death.

On the death of Balboa, the thoughts of conquering Peru were for a time laid aside; however, it still remained an object of desire to all the Spanish adventurers in America. Accordingly, several armaments were fitted out with a design to explore and take possession of the countries to the east of Panama; but, either through the difficulties which attended the undertaking itself, or the bad conduct of the adventurers, all of them proved unsuccessful, until at last it became a general opinion, that Balboa's scheme had been entirely visionary.

Still, however, there were three persons settled at Panama, on whom the common opinion made so little impression, that they determined to go in quest of this country, looked upon to be chimerical by the generality of their neighbours. Their names were *Francisco Pizarro*, *Diego de Almagro*, and *Hernando Luque*. Pizarro and Almagro were soldiers of fortune, and Luque was an ecclesiastic, who acted both as priest and school-master at Panama. Their confederacy was authorized by

6

A new expedition set on foot.

Peru. by Pedrarias governor of Panama; and each engaged to employ his whole fortune in the adventure. Pizarro, being the least wealthy of the three, engaged to take upon himself the greatest share of the fatigue and danger, and to command in person the armament which was to go first upon the discovery. Almagro offered to conduct the supplies of provisions and reinforcements of troops which might be necessary; and Luque was to remain at Panama, in order to negotiate with the governor, and to superintend whatever was carrying on for the general interest.

Meets with
bad success
at first.

In 1524, Pizarro set sail from Panama with a single vessel of small burthen, and 112 men; and so little was he or his countrymen at that time acquainted with the climate of America, that the most improper season of the whole year was chosen for his departure; the periodical winds, which were then set in, being directly opposite to the course which he proposed to steer. The consequence of this was, that after beating about for 70 days, with much danger and fatigue, he had advanced scarce as far to the south-east as a skilful navigator will now make in three days. He touched at several places of Terra Firma; but finding that country exceedingly inhospitable and unhealthy, he was obliged to retire to Chuchama, opposite to the Pearl Islands, where he hoped to receive some reinforcements from Panama. Here he was found by Almagro, who had set out in quest of him with a reinforcement of 70 men, and had suffered distresses very much resembling those of Pizarro himself. In particular, he had lost an eye in a combat with the Indians. However, he had advanced as far as the river of St Juan in the province of Popayan, where the country showing a better aspect, and the inhabitants more friendly, our projectors again began to indulge themselves in hopes, and determined by no means to abandon their scheme.

Almagro returned to Panama, in hopes of recruiting their shattered troops. But the bad accounts of the service gave his countrymen such an unfavourable idea of it, that Almagro could levy no more than 80 men, and these with great difficulty. Slender as this reinforcement was, however, the adventurers did not hesitate at renewing their enterprise. The disasters and disappointments they met with in this new attempt, were scarce inferior to those they had already experienced, when part of the armament at last reached the bay of St Matthew on the coast of Quito, and landed at Tacamez, to the south of the river of Emerald, where they met with a more fertile and campaign country than any they had yet seen; the natives also were more civilized, and clothed in garments of cotton or woollen stuff, adorned with trinkets of gold and silver. But notwithstanding these favourable appearances, Pizarro did not think fit to attack such a powerful empire with an handful of soldiers already exhausted; and therefore retired to a small island called *Gallo*, with part of the troops; from whence he dispatched Almagro to Panama, in hopes of obtaining a reinforcement.

The reception which Almagro met with was by no means agreeable. Some of the adventurers had informed their friends of the many dangers and losses which they had sustained; which not only disheartened people from engaging in the service, but weighed so much with Pedro de los Rios, the successor of Pedra-

rias, that he prohibited the raising of new recruits, and even dispatched a vessel to bring home Pizarro and his companions from the island of Gallo. Almagro and Luque, though much mortified with this disappointment, privately advised Pizarro not to relinquish an enterprise on which they had built all their hopes. He therefore positively refused to obey the orders of the governor, and employed all his address in persuading his men not to abandon him. But the calamities to which they had been exposed had such an effect upon them, that when he drew a line upon the sand with his sword, telling such as wished to return that they might pass over it, only 13 had resolution to remain with him.

Pizarro with his little troop now fixed their residence on the island of Gorgona, which they considered as a safer retreat than Gallo, as being farther removed from the coast and uninhabited, so that they might with the greater security wait for supplies. Here they continued five months in the most unwholesome climate imaginable, and at last had come to a resolution of committing themselves to sea on a float, when a vessel arrived from Panama to their relief. This was the effect of the continued solicitations of Almagro and Luque; who, though they could not prevail upon the governor to favour the undertaking, had succeeded so far as to induce him to send a small vessel to the relief of Pizarro and his unfortunate associates. However, the more effectually to show his disapprobation of Pizarro's scheme, the governor refused to allow one landman to go on board of the ship which he sent. The hopes of the adventurers, however, were now again revived, and Pizarro easily induced them to resume their scheme. Instead of returning to Panama, therefore, they sailed to the south-east, and in 20 days after the discovery of Gorgona they discovered the coast of Peru. Having touched at some places of less note, they at length arrived at Tumbez, remarkable for its stately temple, and a palace of the Incas or sovereigns of the country. Here they found that what had been told them concerning the riches of the country was true; not only ornaments and sacred vessels being made of gold and silver, but even such as were for common use. Yet to attempt the conquest of this opulent empire with their slender force, would have been madness; they contented themselves therefore with viewing it, procuring two of the beasts of burthen called *Llamas*, to which they gave the name of sheep, some vessels of gold and silver, and two young men, whom they proposed to instruct in the Castilian language. With these Pizarro arrived at Panama in the year 1527, near three years after he had set out from that place in his expedition.

The empire of Peru thus discovered, is said to have been originally possessed by independent tribes, justly reckoned among the most savage even in America; living more like wild beasts than men. For several ages they lived in this manner, when suddenly there appeared on the banks of a lake called *Titiaca*, a man and woman of majestic form, and clothed in decent garments. They declared themselves to be the children of the sun, sent by their beneficent parent to instruct and reclaim mankind.

The names of these two extraordinary personages were *Manco Capac* and *Mama Ocla*. At their persuasion,

Peru.

8
Pizarro
abandoned
by all his
men but
thirteen.

9
Goes on
with his
scheme at
all adventures.

10
History of
the Incas of
Peru.

Peru.

fion, several of the dispersed savages united, and, receiving their commands as heavenly injunctions, followed them to Cuzco, where they settled, and began to lay the foundations of a city. Manco Capac instructed the men in agriculture, and other useful arts; while Mama Ocla taught the women to spin and weave; after which Manco turned his attention towards the introducing of proper laws and regulations into his new state.

Thus, according to the Indian tradition, was founded the empire of the Incas, or lords of Peru. At first its extent was small, the territory of Manco Capac reaching not above eight leagues from Cuzco his capital. Within these narrow limits, however, he exercised the most perfect despotism, and the same was maintained by his successors, all of whom were not only obeyed as monarchs, but revered as deities. Their blood was held to be sacred, and, by prohibiting intermarriages with the people, was never contaminated by mixing with that of any other race. The family, thus separated from the rest of the nation, was distinguished by peculiarities in dress and ornaments, which it was unlawful for others to assume. Among the Peruvians, however, it is said, that this high degree of veneration was made use of by the monarchs only to promote the good of their subjects. If we may believe the accounts given by their countrymen, the Peruvian monarchs extended their empire not with a view to increase their own power and wealth, but from a desire of diffusing the blessings of civilization, and the knowledge of the arts which they possessed, among the barbarous people whom they reduced, and, during a succession of 12 monarchs, not one deviated from this character.

Carver's
Modern
General
Traveller.

11
Religion of
the Peruvians.

The Peruvians were taught by Manco to adore the Creator of heaven and earth, whom they denominated *Paca Camac*, that intelligence which animated the world. They seldom built temples or offered sacrifices to him, but worshipped him in their hearts. One temple, however, dedicated to *The unknown God*, the Spaniards found at their arrival, erected in a valley, thence named *the valley of Paca Camac*. The sacrifices instituted in honour of the sun consisted chiefly of lambs; besides which they offered all sorts of cattle, fowls, and corn, and even burnt their finest cloths on the altar by way of incense. They had also drink offerings made of maize or Indian corn, steeped in water. Nor were those oblations the only acts of adoration in general use among them. When they first drank after their meals, they dipped the tip of their finger into the cup, and lifting up their eyes with great devotion, gave the sun thanks for their liquor, before they presumed to take a draught of it.

Besides the worship of the sun, they paid some kind of veneration to the images of several animals and vegetables that had a place in their temples. Those were generally the images brought from the conquered nations, where the people worshipped all sorts of creatures, animate or inanimate; it being the custom, when a province was subdued, to remove all their idols to the temple of the sun at Cuzco.

Exclusive of the solemnities at every full moon, four grand festivals were celebrated annually. The first of those, called *Raymi*, was held in the month of June, immediately after the summer solstice, and was kept

Peru.

not only in honour of the sun, but of their first Inca, Manca Capac, and Coya Mama Ocla, his wife and sister, whom the Incas considered as their first parents, descended immediately from the sun, and sent by him into the world to reform and polish mankind. At this festival, all the viceroys, generals, governors, and nobility, were assembled at the capital city of Cuzco; and the emperor, or Inca, officiated in person as high-priest; though on other occasions the sacerdotal function was discharged by the regular pontiff, who was usually either the uncle or brother of the Inca.

The morning of the festival being come, the Inca, accompanied by his near relations, drawn up in order according to their seniority, went barefoot in procession, at break of day, to the market-place, where they remained looking attentively towards the east in expectation of the rising sun. The luminary no sooner appeared, than they fell prostrate on their faces in the most profound veneration, and universally acknowledged it to be their god and father.

The vassal princes, and nobility, that were not of the blood royal, assembled in another square, and performed the like ceremony. Out of a large flock of sheep the priests then chose a black lamb, which they offered in sacrifice, first turning its head towards the east. From the entrails of the victim, on this occasion, they superstitiously drew prognostics relating to peace and war, and other public events.

That the Peruvians believed in the immortality of the soul, appears from the practice of the Incas, who constantly inculcated to the people, that, on leaving this world, they should enter into a state of happiness provided for them by their god and father the sun.

Before the arrival of the Spaniards in America, the Peruvians were acquainted with some points of astronomy. They had observed the various motions of the planet Venus, and the different phases of the moon. The common people divided the year only by the seasons; but the Incas, who had discovered the annual revolution of the sun, marked out the summer and winter solstices by high towers, which they erected on the east and west of the city of Cuzco. When the sun came to rise directly opposite to four of those towers, on the east side of the city, and to set against those of the west, it was then the summer solstice; and in like manner, when it rose and set against the other towers, it was the winter solstice. They had also erected marble pillars in the great court before the temple of the sun, by which they observed the equinoxes. This observation was made under the equator, when the sun being directly vertical, the pillars cast no shade. At those times they crowned the pillars with garlands of flowers and odiferous herbs, and celebrating a festival, offered to their adored luminary rich presents of gold and precious stones.

They distinguished the months by the moon, and their weeks were called quarters of the moon; but the days of the week they marked only by the ordinal numbers, as first, second, &c. They were astonished at the eclipses of the sun and moon. When the former hid his face, they concluded it was on account of their sins, imagining that this phenom-

12

They were
acquainted
with astro-
nomy be-
fore the ar-
rival of the
Spaniards.

^{Peru.} non portended famine, war, and pestilence, or some other terrible calamity. In a similar state of the moon, they apprehended that she was sick, and when totally obscured, that she was dying. At this alarming crisis they sounded their trumpets, and endeavoured by every kind of noise to rouse the lunar planet from her supposed lethargy; teaching their children to cry out, and call upon *mama quilla*, or "mother moon," that she would not die and leave them to perish.

They made no predictions from any of the stars, but considered dreams, and the entrails of beasts which they offered in sacrifice, as instructive objects of divination. When they saw the sun set, they imagined that he plunged into the ocean, to appear next morning in the east.

¹³ They had
teachers of
morality; Among a people wholly void of letters, the speculative essays of the understanding must have been very rude and imperfect. They had, however, among them amentas, or philosophers, who delivered moral precepts, and likewise cultivated poetry. Comedies and tragedies composed by those bards were acted on their festivals before the king and the royal family, the performers being the great men of the court, and the principal officers of the army. The amentas also composed songs and ballads; but if we may judge from the rudeness of the music with which they are said to have been accompanied, they were far from being agreeable to a polished ear.

¹⁴ And were
not unac-
quainted
with paint-
ing and
statuary. That the Peruvians were not unacquainted with painting and statuary, appears from the furniture and ornaments of their temples and palaces; but in all the implements of mechanic arts they were extremely deficient. Though many goldsmiths were constantly employed, they had never invented an anvil of any metal, but in its stead made use of a hard stone. They beat their plate with round pieces of copper in place of hammers; neither had they any files or graving tools. Instead of bellows for melting their metals, they used copper pipes, of a yard long, almost of the form of a trumpet. Having no tongs to take their heated metal out of the fire, they made use of a stick or copper bar. Their carpenters had no other tools than hatchets made of copper or flint; nor had they learned the use of iron; though the country affords mines of that metal. Instead of nails, they fastened their timber with cords or the tough twigs of trees. A thorn, or a small bone, served them for a needle; and instead of thread, the sinews of animals, or the fibres of some plant. Their knives were made of flint or copper.

¹⁵ Progress of
the Spa-
niards faci-
litized by a
civil war
among the
natives; When the Spaniards first visited this country, they found it agitated by a civil war. Huana Capac, the 12th monarch from the founder of the state, was seated on the throne; who is represented as a prince no less conspicuous for his abilities in war than for his pacific virtues. By him the kingdom of Quito was subdued, which almost doubled the extent of the dominions and power of the Peruvian empire. Notwithstanding the ancient and fundamental law against polluting the blood of the Inca with any foreign alliance, Huana married the daughter of the conquered monarch, by whom he had a son named *Atahualpa*, commonly written *Atabalipa*, to whom, at his death in 1529, he left the kingdom of Quito, bestowing the rest of his dominions upon Huascar his eldest son by a

mother of the royal race. This produced a civil war, in which Atabalipa proved victorious, and afterwards attempted to secure himself on the throne by putting to death all the descendants of Manco Capac, styled *the children of the Sun*, whom he could seize either by force or stratagem; however, from a political motive, he spared the life of his rival Huascar, who had the misfortune to be taken prisoner in an engagement, that, by issuing out orders in his name, he might more easily establish his own authority, and cover the illegality of his birth.

This contest had so much engaged the attention of the Peruvians, that they never once attempted to check the progress of the Spaniards. It was some time, however, before Pizarro was informed of this contest, so much in his favour. The first intelligence which he received of it was a message from Huascar, asking his assistance against Atabalipa, whom he represented as a rebel and an usurper. Pizarro perceived the importance of the intelligence, and therefore determined to push forward, while intestine discord put it out of the power of the Peruvians to attack him with their whole force. Being obliged to divide his troops, in order to leave a garrison in St Michael, which might serve for a place of retreat in case of a disaster, he began his march with only 62 horsemen and 102 foot-soldiers, 20 of whom were armed with cross-bows, and only three with muskets. He directed his course towards Caxamalca, a small town at the distance of 12 days march from St Michael, where Atabalipa was encamped with a considerable body of troops. Before he had proceeded far, an officer dispatched by the Inca met him with a valuable present from that prince, accompanied with a proffer of his alliance, and his assurances of a friendly reception at Caxamalca. Pizarro, according to the usual artifice of his countrymen in America, pretended to come as the ambassador of a very powerful monarch, and declared that he was now advancing with intention to offer Atabalipa his aid against those enemies who disputed his title to the throne.

¹⁶ And by
their igno-
rance of the
motives of
the Spa-
niards. As the object of the Spaniards in entering their country was altogether incomprehensible to the Peruvians, they had formed various conjectures concerning it, without being able to decide whether they should consider their new guests as beings of a superior nature, who had visited them from some beneficent motive, or as formidable avengers of their crimes, and enemies to their repose and liberty. The continual professions of the Spaniards, that they came to enlighten them with the knowledge of truth, and lead them in the way of happiness, favoured the former opinion; the outrages which they committed, their rapaciousness and cruelty, were awful confirmations of the latter. While in this state of uncertainty, Pizarro's declaration of his pacific intentions so far removed all the Inca's fears, that he determined to give him a friendly reception. In consequence of this resolution, the Spaniards were allowed to march in tranquillity across the sandy desert between St Michael and Motupè, where the most feeble effort of an enemy, added to the unavoidable distresses which they suffered in passing through that comfortless region, must have proved fatal to them. From Motupè they advanced towards the mountains which encompass the low country of Peru, and pass-

Peru.

ed through a defile so narrow and inaccessible, that a few men might have defended it against a numerous army. But here likewise, from the same inconsiderate credulity of the Inca, the Spaniards met with no opposition, and took quiet possession of a fort erected for the security of that important station. As they now approached near to Caxamalca, Atabalipa renewed his professions of friendship; and, as an evidence of his sincerity, sent them presents of greater value than the former.

On entering Caxamalca, Pizarro took possession of a large court, on one side of which was a house which the Spanish historians call a palace of the Inca, and on the other a temple of the sun, the whole surrounded with a strong rampart or wall of earth. When he had posted his troops in this advantageous station, he dispatched Hernando Soto, and his brother Ferdinand, to the camp of Atabalipa, which was about a league distant from the town. He instructed them to confirm the declaration which he had formerly made of his pacific disposition, and to desire an interview with the Inca, that he might explain more fully the intention of the Spaniards in visiting his country. They were treated with all the respectful hospitality usual among the Peruvians in the reception of their most cordial friends, and Atabalipa promised to visit the Spanish commander next day in his quarters. The decent deportment of the Peruvian monarch, the order of his court, and the reverence with which his subjects approached his person and obeyed his commands, astonished those Spaniards, who had never met in America with any thing more dignified than the petty cacique of a barbarous tribe. But their eyes were still more powerfully attracted by the vast profusion of wealth which they observed in the Inca's camp. The rich ornaments worn by him and his attendants, the vessels of gold and silver in which the repast offered to them was served up, the multitude of utensils of every kind formed of those precious metals, opened prospects far exceeding any idea of opulence that a European of the 16th century could form.

17
Perfidious
scheme of
Pizarro to
seize the
Inca.

On their return to Caxamalca, while their minds were yet warm with admiration and desire of the wealth which they had beheld, they gave such a description of it to their countrymen, as confirmed Pizarro in a resolution which he had already taken. From his own observation of American manners during his long service in the New World, as well as from the advantages which Cortes had derived from seizing Montezuma, he knew of what consequence it was to have the Inca in his power. For this purpose, he formed a plan as daring as it was perfidious. Notwithstanding the character he had assumed of an ambassador from a powerful monarch, who courted an alliance with the Inca, and in violation of the repeated offers which he had made to him of his own friendship and assistance, he determined to avail himself of the unsuspecting simplicity with which Atabalipa relied on his professions, and to seize his person during the interview to which he had invited him. He prepared for the execution of his scheme with the same deliberate arrangement, and with as little compunction, as if it had reflected no disgrace on himself or his country. He divided his cavalry into three small squadrons, under the command of his brothers Ferdi-

Peru.

nand, Soto, and Benalcazar; his infantry was formed into one body, except 20 of most tried courage, whom he kept near his own person to support him in the dangerous service which he reserved for himself; the artillery, consisting of two field-pieces, and the cross-bow men, were placed opposite to the avenue by which Atabalipa was to approach. All were commanded to keep within the square, and not to move until the signal for action was given.

Early in the morning the Peruvian camp was all in motion. But as Atabalipa was solicitous to appear with the greatest splendour and magnificence in his first interview with the strangers, the preparations for this were so tedious, that the day was far advanced before he began his march. Even then, lest the order of the procession should be deranged, he moved so slowly, that the Spaniards became impatient and apprehensive that some suspicion of their intention might be the cause of this delay. In order to remove this, Pizarro dispatched one of his officers with fresh assurances of his friendly disposition. At length the Inca approached. First of all appeared 400 men in an uniform dress, as harbingers to clear the way before him. He himself, sitting on a throne or couch, adorned with plumes of various colours, and almost covered with plates of gold and silver enriched with precious stones, was carried on the shoulders of his principal attendants. Behind him came some chief officers of his court, carried in the same manner. Several bands of singers and dancers accompanied this cavalcade; and the whole plain was covered with troops, amounting to more than 30,000 men.

As the Inca drew near the Spanish quarters, father Vincent Valverde, chaplain to the expedition, advanced with a crucifix in one hand, and a breviary in the other, and in a long discourse explained to him the doctrine of the creation, the fall of Adam, the incarnation, the sufferings and resurrection of Jesus Christ, the appointment of St Peter as God's viceroy on earth, the transmission of his apostolical power by succession to the popes, the donation made to the king of Castile by pope Alexander of all the regions in the New World. In consequence of all this, he required Atabalipa to embrace the Christian faith, to acknowledge the supreme jurisdiction of the pope, and to submit to the king of Castile as his lawful sovereign; promising, if he complied instantly with this requisition, that the Castilian monarch would protect his dominions, and permit him to continue in the exercise of his royal authority; but if he should impiously refuse to obey this summons, he denounced war against him in his master's name, and threatened him with the most dreadful effects of his vengeance.

This strange harangue, unfolding deep mysteries, and alluding to unknown facts, of which no power of eloquence could have conveyed at once a distinct idea to an American, was so lamely translated by an unskilful interpreter, little acquainted with the idiom of the Spanish tongue, and incapable of expressing himself with propriety in the language of the Inca, that its general tenor was altogether incomprehensible to Atabalipa. Some parts in it, of more obvious meaning, filled him with astonishment and indignation. His reply, however, was temperate. He began with observing, that he was lord of the dominions over which

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he reigned by hereditary succession; and added, that he could not conceive how a foreign priest should pretend to dispose of territories which did not belong to him; that if such a preposterous grant had been made, he, who was the rightful possessor, refused to confirm it; that he had no inclination to renounce the religious institutions established by his ancestors; nor would he forsake the service of the sun, the immortal divinity whom he and his people revered, in order to worship the God of the Spaniards, who was subject to death; that with respect to other matters contained in his discourse, as he had never heard of them before, and did not now understand their meaning, he desired to know where he had learned things so extraordinary. "In this book," answered Valverde, reaching out to him his breviary. The Inca opened it eagerly; and turning over the leaves, lifted it to his ear: "This," says he, "is silent; it tells me nothing;" and threw it with disdain to the ground. The enraged monk, running towards his countrymen, cried out, "To arms, Christians, to arms; the word of God is insulted; avenge this profanation on those impious dogs."

Pizarro, who during this long conference had with difficulty restrained his soldiers, eager to seize the rich spoils of which they had now so near a view, immediately gave the signal of assault. At once the martial music struck up, the cannon and muskets began to fire, the horse sallied out fiercely to the charge, the infantry rushed on sword in hand. The Peruvians, astonished at the suddenness of an attack which they did not expect, and dismayed with the destructive effects of the fire-arms, and the irresistible impression of the cavalry, fled with universal consternation on every side, without attempting either to annoy the enemy or to defend themselves. Pizarro, at the head of his chosen band, advanced directly towards the Inca; and though his nobles crowded around him with officious zeal, and fell in numbers at his feet, while they vied one with another in sacrificing their own lives, that they might cover the sacred person of their sovereign, the Spaniards soon penetrated to the royal seat: and Pizarro seizing the Inca by the arm, dragged him to the ground, and carried him as a prisoner to his quarters. The fate of the monarch increased the precipitate flight of his followers. The Spaniards pursued them towards every quarter, and, with deliberate and unrelenting barbarity, continued to slaughter wretched fugitives, who never once offered at resistance. The carnage did not cease until the close of day. Above 4000 Peruvians were killed. Not a single Spaniard fell, nor was one wounded but Pizarro himself, whose hand was slightly hurt by one of his own soldiers, while struggling eagerly to lay hold on the Inca.

18
Atabalipa
seized by
Pizarro.

19
He offers
an im-
mense sum
for his li-
berty.

The plunder taken on this occasion was immense, but the Spaniards were still unsatisfied; which being observed by the Inca, he endeavoured to apply himself to their ruling passion, avarice, in order to obtain his liberty: and therefore offered such a ransom as astonished them, even after all they knew concerning the opulence of the country. The apartment in which he was confined was 22 feet in length and 16 in breadth; and all this space he engaged to fill with vessels of gold as high as he could reach. This proposal was eagerly caught by Pizarro, and a line was drawn upon the walls to mark the stipulated height.

Atabalipa, charmed with the thoughts of liberty, immediately set about performing his part of the agreement, and dispatched messengers into all parts of the empire, in order to collect the immense quantity of gold which he had promised; and though the unfortunate monarch was now in the hands of his enemies, such was the veneration which his subjects had for him, that his orders were obeyed with as great alacrity as though he had been at full liberty; while he, in the mean time, flattering himself with the hopes of being soon released, made no preparations for expelling the invaders from his dominions.

In a short time Pizarro received intelligence that Almagro was arrived at St Michael with a reinforcement equal to the force he had with him. This was a matter of great joy to the Spaniards, and no small vexation to Atabalipa, who now considered his kingdom as in danger of being totally over-run by these strangers, whose force he neither knew, nor the means they had of transporting themselves. For this reason he determined to put his brother Huascar to death, lest he should join the strangers against him. To this he was the rather inclined, as he had got information that the captive prince had been making applications to them, and had offered them a much larger sum than what was stipulated for the Inca's ransom; and in consequence of this determination the unfortunate prince lost his life.

In the mean time the Indians daily arrived at Caxamalca with vast quantities of treasure; the sight of which so much inflamed the Spaniards, that they insisted upon an immediate division: and this being complied with, there fell to the share of each horseman 8000 pesos, at that time not inferior to the value of as many pounds sterling in the present century, and half as much to each foot soldier, Pizarro and his officers receiving shares proportionable to their dignity. A fifth part was reserved for the emperor, together with some vessels of curious workmanship as a present. In consequence of this immense acquisition of wealth, many of the Spaniards became clamorous for their discharge; which was readily granted by their general, as well knowing that the display of their riches would not fail to allure adventurers more hardy, though less opulent, to his standard.

After this division of the spoil, Atabalipa was very importunate with Pizarro in order to recover his liberty; but the Spaniard, with unparalleled treachery and cruelty, had now determined to put him to death. To this he was urged by Almagro's soldiers, who, though they had received an equal share with the rest, were still unsatisfied. The Inca's ransom had not been completed; and they were apprehensive, that whatever sums might afterwards be brought in, the troops of Pizarro would appropriate them to themselves as part of that ransom. They insisted with Pizarro, therefore, to put him to death, that all the adventurers might for the future be on an equal footing. Accounts were likewise received that troops were assembling in the remote provinces of the empire, which Pizarro suspected to be done by the Inca's orders. These accounts were heightened by one Philippillo an Indian interpreter, who had conceived a passion for one of the unhappy monarch's wives; and for that reason wished to have him put to death. Atabalipa himself,

20
Pizarro re-
solves to
put the
Inca to
death.

too,

Peru.

too, had the misfortune to hasten his own ruin by his conceiving a contemptuous notion of Pizarro, which he had not the precaution to conceal. He had, since they were first discovered by him, admired the European arts of reading and writing, and wished much to know whether he should regard it as a natural or acquired talent. In order to determine this, he desired one of the soldiers who guarded him to write the name of God upon the nail of his thumb. This he showed to several Spaniards successively, asking its meaning; and, to his surprise, they all returned the same answer. At length Pizarro entered; and, on presenting it to him, he blushed, and was obliged to own his ignorance; which inspired the Inca with the contemptuous notion of him above-mentioned.

21

Atabalipa
accused and
condemned,

In order, however, to give some show of justice to such a detestable action, and that he might be exempted from standing singly as the perpetrator, Pizarro resolved to accuse the Inca of some capital crime, and institute a court of judicature for the purpose of trying him. For this purpose, he appointed himself and Almagro, with two assistants, as judges, with full powers to acquit or condemn: an attorney-general was named to carry on the prosecution in the king's name; counsellors were chosen to assist the prisoner in his defence; and clerks were ordained to record the proceedings of court. Before this strange tribunal a charge was exhibited still more amazing. It consisted of various articles: that Atabalipa, though a bastard, had dispossessed the lawful owner of the throne, and usurped the regal power; that he had put his brother and lawful sovereign to death; that he was an idolater, and had not only permitted, but commanded the offering up of human sacrifices; that he had a great number of concubines; that since his imprisonment, he had wasted and embezzled the royal treasures, which now belonged of right to the conquerors; and that he had excited his subjects to take up arms against the Spaniards. On these heads of accusation they proceeded to try the sovereign of a great empire, over whom they had no jurisdiction. To all these charges the Inca pleaded not guilty. With respect to the death of his brother, he alleged, that the Spaniards could take no cognizance of the fact. With regard to the taxes which he had levied, and the wars he had carried on, they were nothing to the Spaniards; and as to the conspiracy against the Spaniards, he utterly denied it. He called heaven and earth to witness the integrity of his conduct, and how faithfully he had performed his engagements, and the perfidy of his accusers. He desired to be sent over to Spain to take his trial before the emperor; but no regard was paid to his intreaties. He was condemned to be burnt alive; which cruel sentence was mitigated, as a great favour, to strangling; and the unhappy monarch was executed without mercy.

22

And
strangled.

The death of the Inca was followed by a revolution in the Spanish affairs, who now became generally odious. Hideous cries were set up by his women as the funeral procession passed by their apartment; many offered to bury themselves alive with him; and on being hindered, strangled themselves out of grief and vexation. The whole town of Caxamalca was filled with lamentation, which quickly extended itself over the whole kingdom. Friends and enemies accused the

23

A general
revolt of
the Peruvians.

Spaniards of inhumanity and treachery. Loads of gold that were coming to Caxamalca by order of the deceased Inca were now stopped; and the loss of the treasure was the first unfortunate consequence which the Spaniards felt from their late iniquitous conduct. The two factions of Indians united against Pizarro; and many of the Spaniards not only exclaimed against the cruelty of the judges, but would even have murdered, had not a sense of the impending danger kept them quiet. At Cuzco the friends of the emperor Huascar proclaimed Manco Capac the legitimate brother of the late Inca, determining to support him to the last against all the machinations of his enemies. Pizarro, in the mean time, set up Taparipa, the son of Atabalipa, causing him to be treated with all the honours due to an emperor. Immediately he set out for Cuzco, the gaining of which was absolutely necessary for his design. An army of Indians occupied the passes, and resolved to dispute his progress. The contest, however, was soon decided; the Spanish cavalry bore down every thing before them, and great numbers of Indians were slain. The conquerors gained a considerable booty; and Pizarro dispatched Almagro to reduce Cuzco, while he himself founded a new colony in the fruitful valley of Xauna; which, however, was not permanent, being afterwards removed to the place where Lima now stands.

While Pizarro was thus employed, another commander, named *Ferdinando Soto*, was detached with 60 horse to make the best of his way to Cuzco, and clear the road for the march of the remainder of the army. He was opposed by a formidable collection of Indians, who had fortified themselves in order to defend a pass against him: for which reason, fearing lest his strength might be unequal, he sent a message to Pizarro, desiring that the Inca might join him, thinking that his presence would awe the Peruvians, and prevent the further effusion of blood; but his expectations were frustrated by the death of the Inca, which happened about this time; so that there was now a necessity for having recourse to arms; for as the Spaniards set up no person in his room, the title of Manco Capac was universally acknowledged.

In the mean time, a new supply of soldiers arriving from Spain, Benalcazar, governor of St Michael, undertook an expedition against Quito, where, according to the report of the natives, Atabalipa had left the greatest part of his treasure. He accomplished his purpose with very great difficulty, having a country covered with rocks and mountains to pass, and being opposed by large bodies of the natives. But when he got possession of the city, to his extreme mortification, he found that the inhabitants had carried off all their gold and silver; for they being now acquainted with the ruling passion of the Spaniards, had taken care to disappoint it, by removing the treasures which they knew very well had been the cause of the expedition.

About the same time Alvarado governor of Guatimala, invaded the province of Chili. In this expedition his troops endured such hardships, and suffered so much from the cold among the Andes, that a fifth part of the men and all the horses died, and at the same time the rest were so much dispirited and emaciated, that they became quite unfit for service. What

24

Chili invaded
by Alvarado.

was

Peru. was worst of all, when they had arrived at the end of their journey, they met with a body of Spaniards drawn up in hostile array to oppose them. These had been sent against him by Pizarro, who claimed Chili as part of his jurisdiction, and were now joined by Benalcazar, with the troops under his command. Alvarado, however, advanced boldly to the attack; but, on the interposition of some moderate men in each party, the difference was accommodated. Alvarado engaged to return to his government, upon his being paid 100,000 pesos to defray the expence of his armament. However, most of his followers remained in the country, and enlisted in the service of Pizarro.

25
He is obliged by Pizarro to abandon the enterprise.

26
Honours conferred on Pizarro by the court of Spain.

In the meantime Ferdinand Pizarro, the brother of the general, had landed in Spain, where he produced such immense quantities of gold and silver as astonished the court, even after all they had seen of the wealth of their new-discovered territories. The general's authority was confirmed to him with new powers and privileges, and the addition of 70 leagues extending along the coast, to the southward of the territory granted in his former patent. Almagro had the title of *adelantado* or *governor* conferred upon him, with jurisdiction over 200 leagues of a country lying southward from the province allotted to Pizarro; he himself was made a knight of the order of St Jago.

Of these transactions some accounts were received at Peru before the arrival of Ferdinand Pizarro himself; and no sooner did Almagro hear that he had obtained the royal grant of an independent government, than, pretending that Cuzco, the capital of all Peru, lay within his jurisdiction, he attempted to seize it. Pizarro was no less ready to oppose him; and a very dangerous civil war was about to take place, when the quarrel was made up, on condition that Almagro should attempt the conquest of Chili; and if he did not find there an establishment equivalent to his expectations, Pizarro should yield up to him part of Peru.

By this reconciliation Pizarro was left at liberty to settle the internal policy of his province, which, though little qualified for a legislator, he attempted, by dividing the country into various districts, appointing magistrates to preside in each, and establishing such regulations concerning the administration of justice, the royal revenue, &c. as occurred to him. The seat of government he removed from Cuzco to Lima, which he named *Ciudad des los Reyes*, and which name it still retains among the Spaniards in all legal and formal deeds. Its other name, *Lima*, is a corruption of *Rimac*, the name of the valley in which the city stands.

In the mean time Almagro had set out on his expedition to Chili; the event of which has been related under the article CHILI; and while he was thus employed, Pizarro encouraged some of his most distinguished officers to invade those provinces of the empire which had not yet been visited by the Spaniards. This he did with a view to keep them employed, and prevent tumults; but it was attended with very terrible consequences. No sooner did Manco Capac the Inca perceive the security of the Spaniards in thus dividing their forces, than he seized the opportunity of making one vigorous effort to redress the wrongs of himself and his countrymen, and expel the invaders, who had

tyrannized in such a cruel manner. Though strictly guarded by the Spaniards, he found means to communicate his intentions to the chief men of his nation, whom he joined in the year 1536, under pretence of celebrating a festival which he had obtained liberty from Pizarro to attend. Upon this the standard of war was immediately erected, and a most formidable army, according to the Spanish historians, of 200,000 men collected. Many Spaniards were massacred in their habitations, and several detachments entirely cut off; and while this vast army laid siege to Cuzco, another formidable body invested Lima, and kept the governor closely shut up. The greatest effort, however, was made against Cuzco, which was defended by Pizarro and his two brothers, with only 170 men. The siege lasted nine months; many of the Spaniards were killed; among whom was Juan Pizarro, the general's brother, and the best beloved of them all. The rest were reduced to the most desperate situation, when Almagro appeared suddenly in the neighbourhood of Cuzco. He had received such accounts of the insurrection in Peru, as would at any rate have determined him to return to the assistance of Pizarro; but besides this, he had now received the royal patent, creating him governor of Chili, and deemed it certain beyond all contradiction, that Cuzco lay within his jurisdiction; for which reason he hastened to prevent it from falling into the hands of the Peruvians. On his arrival his assistance was solicited by both parties. The Inca made many advantageous proposals; but at length despairing of obtaining any cordial union with a Spaniard, he attacked him in the night by surprise with a great body of chosen troops. But the Spanish valour and discipline prevailed against all the numbers of their enemies; and the Peruvians were repulsed with such slaughter, that a great part of the remainder dispersed, and Almagro advanced to the gates of Cuzco without opposition. Pizarro's brothers took measures to oppose his entrance; but prudence for the present restrained both parties from entering into a civil war while they were surrounded with enemies; and therefore each leader endeavoured to corrupt the followers of his antagonist. In this Almagro had the advantage; and so many of Pizarro's troops deserted in the night, that Almagro was encouraged to advance towards the city, where he surprised the centinels; and investing the house where the two brothers were lodged, he compelled them, after an obstinate defence, to surrender at discretion; and Almagro's authority over Cuzco was immediately recognized as authentic.

27
A dreadful insurrection of the Peruvians.

28
They are defeated and dispersed.

In this fray only two or three persons were killed; but matters soon began to wear a more serious aspect. Francis Pizarro, having dispersed the Peruvians who invested Lima, and received considerable reinforcements from other provinces, ordered 500 men under the command of Alonso de Alvarado to march to Cuzco, in hopes of relieving his brothers, if they were not already cut off. They advanced to a small distance from the capital, before they knew that they had a more formidable enemy than the Indians to encounter. When they saw their countrymen drawn up on the banks of a river to oppose them, they were greatly surprised; however, Almagro, who wished rather to gain them than to fight, began with attempting to seduce their leader. Alvarado could not by any means be gained over;

29
Civil war between Pizarro and Almagro.

Peru.

over; but being inferior in military skill, Almagro attacked him by surprise, entirely defeated and dispersed his army, taking himself and some of his principal officers prisoners.

This victory seemed decisive; and Almagro was advised to make it so by putting to death Gonzalo and Ferdinand Pizarro, Alvarado, and some others whom he could not hope to gain. This advice, however, he declined from motives of humanity, and a desire of making his adversary appear the aggressor. For these reasons, instead of marching directly against Pizarro, he retired quietly to Cuzco; which gave his adversary time to recollect himself from the disorder into which the news of so many disasters had thrown him. He began again to practise upon Almagro those arts which had before proved successful; and Almagro again suffered himself to be deceived by pretended offers of pacification. The negotiations for this purpose were protracted for several months; and while Almagro was employed in detecting and eluding the fraudulent intentions of the governor, Gonzalo Pizarro and Alvarado found means to corrupt the soldiers who guarded them, and not only made their own escape, but persuaded 60 of Almagro's men to accompany them. There now remained only Ferdinand Pizarro in the hands of Almagro; and he was delivered by another act of treachery. The general proposed that all points of controversy should be submitted to the decision of their sovereign; and that Ferdinand Pizarro should be instantly set at liberty, and return to Spain, together with some other officers whom the general proposed to send over to show the justice of his claims. Though the intention of Pizarro by making this proposal was evident, Almagro was deceived by it, and released those whom Pizarro wanted; which he had no sooner done, than the latter threw off all disguise, and openly declared, that arms alone must now decide the matter between them. He therefore immediately set out for Cuzco with an army of 700 men, to which Almagro had only 500 to oppose. From the weakness of his forces, probably, Almagro did not attempt to guard some strong passes, through which Pizarro had to march, but waited patiently for his adversary in a plain open country.

30
Almagro
defeated
and taken
prisoner,

In the mean time, Pizarro advanced without any obstruction from his enemy; and an engagement soon happened, in which Almagro was defeated and taken prisoner. The conquerors behaved with great cruelty, massacring a great number of officers, and treating Almagro himself with great severity. The Indians had assembled in great numbers to see the battle, with an intention to join the vanquished party; but were so much overawed by the Spaniards, that they retired quietly after the battle was over, and thus lost the only opportunity they ever had of expelling their tyrants.—Almagro, after having for some months languished in prison, was at length formally tried, and condemned to die by Pizarro. Notwithstanding his consummate bravery, for which he was remarkable, this hardy veteran could not bear the deliberate approach of death, but condescended to use intreaties to save his life. The Pizarros, however, continued inflexible; and he was first strangled in prison, and then publicly beheaded. He left one son by an Indian woman,

31
And
strangled.

whom he appointed his successor, by virtue of a power granted him by the emperor.

Peru.

As during these dissensions all intercourse with Spain ceased, it was some time before the accounts of the civil war were received at court. The first intelligence was given by some of Almagro's soldiers, who had left America on the ruin of their cause; and they did not fail to represent the injustice and violence of Pizarro in the strongest colours, which strongly prejudiced the emperor against him. In a short time, however, Ferdinand Pizarro arrived, and endeavoured to give matters a new turn. The emperor was uncertain which of them he ought to believe; and therefore thought it necessary to send over some person with ample powers to inquire into the merits of the cause, and to determine certainly who was in the wrong. If he found the governor still alive, he was to assume only the title of judge, in order to have the appearance of acting in concert with him; but if he was dead, the viceroy might then produce his commission appointing him Pizarro's successor in the government. This complaisance to Pizarro, however, proceeded more from a dread of his power than from any other thing; for in the mean time, his brother Ferdinand was arrested at Madrid, and confined to a prison, where he remained above 20 years. The person nominated to this important trust was Christoval Vaca de Castro.

While this gentleman was preparing for his voyage, Pizarro, considering himself as the unrivalled master of Peru, proceeded to parcel out its territories among the conquerors; and had this division been made with any degree of impartiality, the extent of country which he had to bestow was sufficient to have gratified his friends, and to have gained his enemies. But Pizarro conducted this transaction, not with the equity and candour of a judge attentive to discover and to reward merit, but with the illiberal spirit of a party-leader. Large districts, in parts of the country most cultivated and populous, were set apart as his own property, or granted to his brothers, his adherents, and favourites. To others, lots less valuable and inviting were assigned. The followers of Almagro, amongst whom were many of the original adventurers, to whose valour and perseverance Pizarro was indebted for his success, were totally excluded from any portion in those lands, towards the acquisition of which they had contributed so largely. As the vanity of every individual sets an immoderate value upon his own services, and the idea of each, concerning the recompence due to them, rose gradually to a more exorbitant height in proportion as their conquests extended, all who were disappointed in their expectations exclaimed loudly against the rapaciousness and partiality of the governor. The partisans of Almagro murmured in secret, and meditated revenge.

Rapid as the progress of the Spaniards in South America had been since Pizarro landed in Peru, their avidity of dominion was not yet satisfied. The officers to whom Ferdinand Pizarro gave the command of different detachments, penetrated into several new provinces; and though some of them were exposed to great hardships in the cold and barren regions of the Andes, and others suffered distress not inferior amidst the wood and marshes of the plains, they made disco-

veries

Peru.

Peru.

33.
Expedition
of Gonzales
Pizarro.

veries and conquests which extended their knowledge of the country, as well as added to their power. Pedro de Valdivia re-assumed Almagro's scheme of invading Chili; and, notwithstanding the fortitude of the natives in defending their possessions, made such progress in the conquest of the country, that he founded the city of St Jago, and gave a beginning to the establishment of the Spanish dominion there. But of all the enterprises undertaken about this period, that of Gonzales Pizarro was the most remarkable. The governor, who seems to have resolved that no person in Peru should possess any station of distinguished eminence or authority but those of his own family, had deprived Benalcazar, the conqueror of Quito, of his command in that kingdom, and appointed his brother Gonzales to take the government of it. He instructed him to attempt the discovery and conquest of the country to the east of the Andes; which, according to the information of the Indians, abounded with cinnamon and other valuable spices. Gonzales, not inferior to any of his brothers in courage, and no less ambitious of acquiring distinction, eagerly engaged in this difficult service. He set out from Quito at the head of 340 soldiers, near one half of whom were horsemen, with 4000 Indians to carry their provisions. In forcing their way through the defiles, or over the ridges of the Andes, excess of cold and fatigue, to neither of which they were accustomed, proved fatal to the greater part of the wretched attendants. The Spaniards, tho' more robust, and inured to a variety of climates, suffered considerably, and lost some men; but when they descended into the low country, their distress increased. During two months it rained incessantly, without any interval of fair weather long enough to dry their clothes. The vast plains upon which they were now entering, either altogether without inhabitants, or occupied by the rudest and least industrious tribes in the New World, yielded little subsistence. They could not advance a step but as they cut a road through woods, or made it through marshes. Such incessant toil, and continual scarcity of food, seem more than sufficient to have exhausted and dispirited any troops. But the fortitude and perseverance of the Spaniards in the 16th century were insuperable. Allured by frequent but false accounts of rich countries before them, they persisted in struggling on, until they reached the banks of the Coca or Napo, one of the large rivers whose waters pour into the Maragnon, and contribute to its grandeur. There, with infinite labour, they built a bark, which they expected would prove of great utility, both in conveying them over rivers, in procuring provisions, and in exploring the country. This was manned with 50 soldiers, under the command of Francis Orellana, the officer next in rank to Pizarro. The stream carried them down with such rapidity, that they were soon far ahead of their countrymen, who followed slowly and with difficulty by land.

34.
Orellana
sails down
the river
Maragnon,
and deserts
Pizarro.

At this distance from his commander, Orellana, a young man of an aspiring mind, began to fancy himself independent; and, transported with the predominant passion of the age, he formed the scheme of distinguishing himself as a discoverer, by following the course of the Maragnon until it joined the ocean, and by surveying the vast regions through which it flows. This scheme of Orellana's was as bold as it was treacherous. For, if he be chargeable with the guilt of having vio-

lated his duty to his commander, and with having abandoned his fellow-soldiers in a pathless desert, where they had hardly any hopes of success, or even of safety, but what were founded on the service which they expected from the bark, his crime is, in some measure, balanced by the glory of having ventured upon a navigation of near 2000 leagues, through unknown nations, in a vessel hastily constructed with green timber, and by very unskilful hands, without provisions, without a compass, or a pilot. But his courage and alacrity supplied every defect. Committing himself fearlessly to the guidance of the stream, the Napo bore him along to the south, until he reached the great channel of the Maragnon. Turning with it towards the coast, he held on his course in that direction. He made frequent descents on both sides the river, sometimes seizing by force of arms the provisions of the fierce savages seated on its banks, and sometimes procuring a supply of food by a friendly intercourse with more gentle tribes. After a long series of dangers, which he encountered with amazing fortitude, and of distresses which he supported with no less magnanimity, he reached the ocean, where new perils awaited him. These he likewise surmounted, and got safe to the Spanish settlement in the island Cubagua; from thence he sailed to Spain. The vanity natural to travellers who visit regions unknown to the rest of mankind, and the art of an adventurer, solicitous to magnify his own merit, concurred in prompting him to mingle an extraordinary proportion of the marvellous in the narrative of his voyage. He pretended to have discovered nations so rich, that the roofs of their temples were covered with plates of gold; and described a republic of women so warlike and powerful, as to have extended their dominion over a considerable tract of the fertile plains which he had visited. Extravagant as those tales were, they gave rise to an opinion, that a region abounding with gold, distinguished by the name of *El Dorado*, and a community of Amazons, were to be found in this part of the New World; and such is the propensity of mankind to believe what is wonderful, that it has been slowly, and with difficulty, that reason and observation have exploded those fables. The voyage, however, even when stripped of every romantic embellishment, deserves to be recorded, not only as one of the most memorable occurrences in that adventurous age, but as the first event that led to any certain knowledge of those immense regions that stretch eastward from the Andes to the ocean.

No words can describe the consternation of Pizarro, when he did not find the bark at the confluence of the Napo and Maragnon, where he had ordered Orellana to wait for him. He would not allow himself to suspect that a man, whom he had entrusted with such an important command, could be so base and so unfeeling as to desert him at such a juncture. But imputing his absence from the place of rendezvous to some unknown accident, he advanced above 50 leagues along the banks of the Maragnon, expecting every moment to see the bark appear with a supply of provisions. At length he came up with an officer whom Orellana had left to perish in the desert, because he had the courage to remonstrate against his perfidy. From him he learned the extent of Orellana's crime; and his followers perceived at once their own desperate situation, when deprived of their only resource. The spirit of the stout-

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est

Peru.
35
Extreme distress of
Gonzales Pizarro and
his men.

est hearted veteran sunk within him; and all demanded to be led back instantly. Pizarro, though he assumed an appearance of tranquillity, did not oppose their inclination. But he was now 1200 miles from Quito; and in that long march the Spaniards encountered hardships greater than those they had endured in their progress outward, without the alluring hopes which then soothed and animated them under their sufferings. Hunger compelled them to feed on roots and berries, to eat all their dogs and horses, to devour the most loathsome reptiles, and even to gnaw the leather of their saddles and sword-belts. Four thousand Indians, and 210 Spaniards, perished in this wild and disastrous expedition, which continued near two years; and as 50 men were aboard the bark with Orellana, only 80 got back to Quito. These were naked like savages, and so emaciated with famine, or worn out with fatigue, that they had more the appearance of spectres than of men.

36
A conspiracy formed
against the
governor;

But, instead of returning to enjoy the repose which his condition required, Pizarro, on entering Quito, received accounts of a fatal event that threatened calamities more dreadful to him than those through which he had passed. From the time that his brother made that partial division of his conquests which has been mentioned, the adherents of Almagro, considering themselves as proscribed by the party in power, no longer entertained any hope of bettering their condition. Great numbers in despair resorted to Lima, where the house of young Almagro was always open to them: and the slender portion of his father's fortune, which the governor allowed him to enjoy, was spent in affording them subsistence. The warm attachment with which every person who served under the elder Almagro devoted himself to his interests, was quickly transferred to his son, who was now grown up to the age of manhood, and possessed all the qualities which captivate the affections of soldiers. Of a graceful appearance, dexterous at all martial exercises, bold, open, generous, he seemed to be formed for command; and as his father, conscious of his own inferiority from the total want of education, had been extremely attentive to have him instructed in every science becoming a gentleman, the accomplishments which he had acquired heightened the respect of his followers, as they gave him distinction and eminence among illiterate adventurers. In this young man the Almagrians found a point of union which they wanted; and looking up to him as their head, were ready to undertake any thing for his advancement. Nor was affection for Almagro their only incitement; they were urged on by their own distresses. Many of them, destitute of common necessities, and weary of loitering away life, a burden to their chief, or to such of their associates as had saved some remnant of their fortune from pillage and confiscation, longed impatiently for an occasion to exert their activity and courage, and began to deliberate how they might be avenged on the author of all their misery. Their frequent cabals did not pass unobserved; and the governor was warned to be on his guard against men who meditated some desperate deed, and had resolution to execute it. But, either from the native intrepidity of his mind, or from contempt of persons whose poverty rendered their machinations of little consequence, he disregarded the admonitions of

his friends. "Be in no pain (said he carelessly) about my life; it is perfectly safe, as long as every man in Peru knows that I can in a moment put him to death who dares to harbour a thought against it." This security gave the Almagrians full leisure to digest and ripen every part of their scheme; and Juan de Herrada, an officer of great abilities, who had the charge of Almagro's education, took the lead in their consultations, with all the zeal which that connection inspired, and with all the authority which the ascendant that he was known to have over the mind of his pupil gave him.

On Sunday, the 26th of June, at mid-day, the season of tranquillity and repose in all sultry climates, Herrada, at the head of 18 of the most determined conspirators, sallied out of Almagro's house in complete armour; and drawing their swords, as they advanced hastily towards the governor's palace, cried out, "Long live the king, but let the tyrant die." Their associates, warned of their motions by a signal, were in arms at different stations ready to support them. Though Pizarro was usually surrounded by such a numerous train of attendants as suited the magnificence of the most opulent subject of the age in which he lived, yet as he was just risen from table, and most of his own domestics had retired to their own apartments, the conspirators passed through the two outer courts of the palace unobserved. They were at the bottom of the staircase, before a page in waiting could give the alarm to his master, who was conversing with a few friends in a large hall. The governor, whose steady mind no form of danger could appal, starting up, called for arms, and commanded Francisco de Chaves to make fast the door. But that officer, who did not retain so much presence of mind as to obey this prudent order, running to the top of the staircase, wildly asked the conspirators what they meant, and whither they were going? Instead of answering, they stabbed him to the heart, and burst into the hall. Some of the persons who were there threw themselves from the windows; others attempted to fly; and a few drawing their swords, followed their leader into an inner apartment. The conspirators, animated with having the object of their vengeance now in view, rushed forward after them. Pizarro, with no other arms than his sword and buckler, defended the entry, and, supported by his half-brother Alcantara and his little knot of friends, maintained the unequal contest with intrepidity worthy of his past exploits, and with the vigour of a youthful combatant. "Courage (cried he), companions, we are yet enow to make those traitors repent of their audacity." But the armour of the conspirators protected them, while every thrust they made took effect. Alcantara fell dead at his brother's feet; his other defendants were mortally wounded. The governor, so weary that he could hardly wield his sword, and no longer able to parry the many weapons furiously aimed at him, received a deadly thrust full in his throat, sunk to the ground, and expired.

As soon as he was slain, the assassins ran out into the streets, and waving their bloody swords, proclaimed the death of the tyrant. Above 200 of their associates having joined them, they conducted young Almagro in solemn procession through the city; and assembling the magistrates and principal citizens, compelled

Peru.

37
Who is
murdered.

Peru. }
38
Young Al-
magro
heads the
rebels,

perelled them to acknowledge him as lawful successor to his father in his government. The palace of Pizarro, together with the houses of several of his adherents, were pillaged by the soldiers; who had the satisfaction at once of being avenged on their enemies, and of enriching themselves by the spoils of those through whose hands all the wealth of Peru had passed.

The new governor marched into the heart of the empire, in order to reduce such places as refused to acknowledge his authority. A multitude of russians joined him on his march. His army breathed nothing but vengeance and plunder: every thing gave way before it. If the military talents of the general had equalled the ardour of his troops, the war had ended here. Unhappily for Almagro, he had lost his conductor John de Herrada. His inexperience made him fall into the snares that were laid for him by Pedro Alvares, who had put himself at the head of the opposite party. He lost, in attempting to unravel his plots, that time that he ought to have employed in fighting. In these circumstances, an event, which no one could have foreseen, happened to change the face of affairs.

The licentiate Vaca di Castro, who had been sent from Europe to try the murderers of old Almagro, arrived at Peru. As he was appointed to assume the government in case Pizarro was no more, all who had not sold themselves to the tyrant hastened to acknowledge him. Uncertainty and jealousy, which had for too long a time kept them dispersed, were no longer an obstacle to their re-union. Castro, who was as resolute as if he had grown old in the service, did not suffer their impatience to languish, but instantly led them against the enemy. The two armies engaged at Chapas on the 16th of September 1542, and fought with inexpressible obstinacy. Victory, after having wavered a long time, at the close of the day decided in favour of that party whose cause was the most just. Those among the rebels who were most guilty, dreading to languish under disgraceful tortures, provoked the conquerors to murder them, crying out, like men in despair, *It was I who killed Pizarro*. Their chief was taken prisoner, and died on the scaffold.

While these scenes of horror were transacting in America, the Spaniards in Europe were employed in finding out expedients to terminate them; though no measures had been taken to prevent them. Peru had only been made subject to the audience of Panama, which was too remote to superintend the maintenance of good order, and had too little influence to make its decrees respected. A supreme tribunal was then established at Lima for the dispensation of justice, which was to be invested with authority sufficient to enforce and to reward a due obedience to the laws. Blasco Nunez Vela, who presided in it as viceroy, arrived in 1544, attended by his subordinates in office, and found every thing in the most dreadful disorder.

To put an end to these tumults which now subsisted, would have required a profound genius, and many other qualities which are seldom united. Nunez had none of these advantages. Nature had only given him probity, firmness, and ardour; and he had taken no pains to improve these gifts. With these virtues, which were almost defects in his situation, he began to fulfil

his commission, without regard to places, persons, or Peru.
circumstances.

Contrary to the opinion of all intelligent persons, who wished that he should wait for fresh instructions from Europe, he published ordinances, which declared that the lands the conquerors had seized should not pass to their descendants, and which dispossessed those who had taken part in the civil commotions. All the Peruvians who had been enslaved by monks, bishops, and persons belonging to the government, were declared free. Those who belonged to other masters were to be freed from their shackles at the death of their oppressors. They could no longer be compelled to bury themselves in the mines, nor could any kind of labour be exacted from them without payment. Their tribute was fixed. The Spaniards who travelled on foot were deprived of the right of taking three Indians to carry their baggage; and those who travelled on horseback, of the right of taking five. The caciques were discharged from the obligation of furnishing the traveller and his retinue with provisions gratis. Other tyrannical establishments also would soon have been proscribed; and the conquered people were on the eve of being sheltered under the protection of laws, which would at least have tempered the rigours of the right of conquest, if even they had not entirely repaired the injustice of them; but it should seem that the Spanish government was only to be unfortunate in the good it attempted to effect.

A change so unexpected filled those with consternation who saw their fortunes wrested from them, or who lost the flattering hope of transmitting them to their posterity. Even those who were not affected by these interested views, being accustomed to look upon the Indians as the instruments and victims of their avarice, had no conception that any other ideas could prevail concerning them. From astonishment they proceeded to indignation, murmuring, and sedition. The viceroy was degraded, put in irons, and banished to a desert island, till he could be conveyed to Spain.

Gonzales Pizarro was then returned from his hazardous expedition, which had employed him long enough to prevent him from taking a part in those revolutions which had so rapidly succeeded each other. The anarchy he found prevailing at his return, inspired him with the idea of seizing the supreme authority. His fame and his forces made it impossible that this should be refused him; but his usurpation was marked with so many enormities, that Nunez was regretted. He was recalled from exile, and soon collected a sufficient number of forces to enable him to take the field. Civil commotions were then renewed with extreme fury by both parties. No quarter was asked or given on either side. The Indians took part in this as they had done in the preceding wars; some ranged themselves under the standard of the viceroy, others under the banners of Gonzales. From 15,000 to 20,000 of these unhappy wretches, who were scattered about in each army, dragged up the artillery, levelled the roads, carried the baggage, and destroyed one another. Their conquerors had taught them to be sanguinary. After a variety of advantages for a long time alternately obtained, fortune at length favoured the rebellion under

4Y
He is over-
come and
killed by
Gonzales
Pizarro.

Peru.

the walls of Quito in the month of January, in the year 1545; and Nunez with the greatest part of his men were massacred.

Pizarro took the road of Lima, where they were deliberating on the ceremonies with which they should receive him. Some officers wished that a canopy should be carried for him to march under, after the manner of kings. Others, with adulation still more extravagant, pretended that part of the walls of the town, and even some houses, must be pulled down; as was the custom at Rome, when a general obtained the honours of a triumph. Gonzales contented himself with making his entrance on horseback, preceded by his lieutenant, who marched on foot. Four bishops accompanied him, and he was followed by the magistrates. The streets were strewn with flowers, and the air resounded with the noise of bells and various musical instruments. This homage totally turned the head of a man naturally haughty, and of confined ideas. He spoke and acted in the most despotic manner.

Had Gonzales possessed judgment and the appearance of moderation, it would have been possible for him to render himself independent. The principal persons of his party wished it. The majority would have beheld this event with indifference, and the rest would have been obliged to consent to it. Blind cruelties, insatiable avarice, and unbounded pride, altered these dispositions. Even those, whose interests were connected with those of the tyrant, wished for a deliverer.

42
An end put
to the troubles
by
Pedro di la
Gasca.

Such a deliverer arrived from Europe in the person of the licentiate Pedro di la Gasca. The squadron and the provinces of the mountains immediately declared for a person who was invested with a lawful authority to govern them. Those who lived concealed in deserts, caverns, and forests, quitted their retreats to join him. Gonzales, who saw no resource left to support him but in some great achievement, took the road of Cuzco, with a resolution to give battle. At some leagues distance from this place he met the royal army, and attacked it on the 9th of June 1548. One of his lieutenants, seeing him abandoned at the first charge by his best soldiers, advised him to throw himself into the enemy's battalions, and perish like a Roman: but this weak man chose rather to surrender, and end his life on a scaffold. Carvajal, a more able warrior, and more ferocious than himself, was quartered. This man, when he was expiring, boasted that he had massacred with his own hand 1400 Spaniards and 20,000 Indians.

Such was the last scene of a tragedy, of which every act has been marked with blood. The government was moderate enough not to continue the proscriptions; and the remembrance of the horrid calamities they had suffered kept the Spaniards in the bounds of subjection. What still remained of that commotion that had been raised in their minds, insensibly sunk into a calm; and the country hath remained in quiet ever since.

43
Hard state
of the Peruvians.

With regard to the Peruvians, the most cruel measures were taken to render it impossible for them to rebel. Tupac Amaru, the heir of their last king, had taken refuge in some remote mountains, where he lived in peace. There he was so closely surrounded by the

troops which had been sent out against him, that he was forced to surrender. The viceroy Francis de Toledo caused him to be accused of several crimes that he had not committed, and for which he was beheaded in 1571. All the other descendants of the Incas shared the same fate, under pretence that they had conspired against their conquerors. The horror of these enormities excited so universal an indignation both in the Old and the New World, that Philip II. thought himself obliged to disavow them; but the infamous policy of this prince was so notorious, that no credit was given to this appearance of his justice and humanity.

The empire of Peru, at the time it was subdued, extended along the South Sea, from the river of Emeralds to Chili, and on the land side to Popayan, according to some geographers. It contained within its extent that famous chain of mountains which rises in the Terra Magellanica, and is gradually lost in Mexico, in order to unite, as it should seem, the southern parts of America with the northern.

It is now divided into three grand divisions or provinces; Quito, Lima, or Los Reyes, and Los Charcos. As to its climate, mines, soil, and produce, they differ greatly in different parts of the country.

The extensive province of Quito is bounded on the north by Popayan, and includes a part of that government, also by Santa Fe de Bogota; on the south by the governments of Piura and Chachapoyas; on the east it extends over the whole government of Maynas and the river of the Amazons to the meridian, which divides the Spanish from the Portuguese dominions; and on the west it is bounded by the South Sea; extending, according to Antonio de Ulloa, 600 leagues in length, and about 200 in its greatest breadth; but this greatly exceeds the computation of all other geographers. He however observes, that it must be owned a great part of those vast dominions are either inhabited by nations of Indians, or have not hitherto been sufficiently peopled by the Spaniards, if indeed they have been thoroughly known; and that all the parts that can properly be said to be peopled, and actually subject to the Spanish government, are those intercepted by the two Cordilleras of the Andes, which, in comparison to the extent of the country, may be termed a street or lane, 15 leagues, or sometimes more, from east to west; to this must be added several detached governments, separated by the very extensive tracts inhabited by free Indians.

The climate of Quito differs from all others in the same parallel, since even in the centre of the torrid zone, or although under the equinoctial, the heat is not only very tolerable, but even in some places the cold is painful; while others enjoy all the advantages of a perpetual spring, the fields being constantly covered with verdure, and enamelled with flowers of the most lively colours. The mildness of the climate, free from the extremes of heat and cold, and the constant equality of the day and night, render this country, which from its situation might be thought to be parched by the constant heat of the sun, and scarcely inhabitable, both pleasant and fertile; for nature has here dispensed her blessings with so liberal a hand, that this country in several respects surpasses those of the temperate zones, where the vicissitudes of winter and summer, and the change

Peru.

44

Extent of
the empire.Payne's geo-
graphy.

45

Province of
Quito.

46

Climate,
seasons, &c.
of this province.

Peru.

change from heat to cold, cause the extremes of both to be more sensibly felt. However, in different parts of the country, the air is very different; in one part are mountains of a stupendous height and magnitude, with their summits covered with snow. The plains are temperate, the valleys hot, and, according to the high or low situation of the country, are found all the variety of gradations in temperature possible to be conceived between the extremes of heat and cold.

Quito, the capital, in $0^{\circ} 13'$ south latitude, and $77^{\circ} 50'$ west longitude from Greenwich, is so happily situated, that neither heat nor cold are troublesome, though both may be felt in its neighbourhood; and what renders this equality more delightful is, that it is constant throughout the whole year, the difference between the seasons being scarce perceptible. Indeed the mornings are cool, the remainder of the day warm, and the nights of an agreeable temperature. See QUITO.

The winds, which are pure and salubrious, blow for the most part from north to south, but never with any violence, though they sometimes shift their quarters, but without any regard to the season of the year. Such signal advantages resulting from the climate, soil, and aspect of this country, would be sufficient to render it the most enviable spot upon earth, as it is supposed to be the most elevated, if, whilst enjoying these delights, the inhabitants were not harassed by terror, and exposed to continual danger; for here tremendous tempests of thunder and lightning prevail, which are sufficient to appal the stoutest heart; whilst earthquakes frequently spread universal apprehensions, and sometimes bury cities in ruins.

The distinction of winter and summer consists in a very minute difference; the interval between the month of September and those of April, May, or June, is here called the winter season, and the other months compose the summer. In the former season the rain chiefly prevails, and in the latter the inhabitants frequently enjoy whole days of fine weather; but whenever the rains are discontinued for above a fortnight, the inhabitants are in the utmost consternation, and public prayers are offered up for their return. On the other hand, when they continue a short time without intermission, the like fears prevail, and the churches are again crowded with supplicants to obtain fine weather; for a long drought produces dangerous diseases, and a continual rain, without intervals of sunshine, destroys the fruits of the earth. The city of Quito, however, enjoys one peculiar advantage in being free from musketoes and other troublesome insects, such as fleas and venomous reptiles, except the *nigua*, or *pique*, which is a very small insect shaped like a flea, but hardly visible to the sight. See CHERO.

47
Soil, produce, &c.

The fertility of the soil here is incredible, for the fruits and beauties of the several seasons are visible at the same time; and the curious European observes with a pleasing admiration, that while some herbs of the field are fading, others of the same kind are springing up; while some flowers lose their beauty, others blow to continue the enamelled prospect: thus, when the fruits of the trees have attained their maturity, and the leaves begin to change their colour, fresh leaves blossom, and fruits are seen in their proper gradations in size and ripeness on the same tree. The same incessant fertility is conspicuous in the corn, both reaping and

sowing being carried on at the same time: so that the declivities of the neighbouring hills exhibit all the beauties of the four seasons in one assemblage. Though all this is generally seen, yet there is a settled time for the grand harvest: yet sometimes the most favourable season for sowing in one place is a month or two after that of another, though their distance does not exceed three or four leagues. Thus in different spots, and sometimes in one and the same, sowing and reaping are performed throughout the whole year, the forwardness or retardment naturally arising from the different situations, such as mountains, rising grounds, plains, and valleys; and the temperature being different in each, the best times for performing the several operations of husbandry must also differ.

The *chirimoya* is considered as one of the most delicious fruits in the world. Its dimensions are various, being from one to five inches in diameter. Its figure is imperfectly round, flattened towards the stalk, where it forms a kind of navel; but all the other parts are nearly circular. It is covered with a thin soft shell, which adheres so closely to the pulp as not to be separated from it without a knife. The outward coat is green, variegated with prominent veins, forming all over it a kind of net-work. The pulp is white, and contains a large quantity of juice resembling honey, of a sweet taste, mixed with a gentle acid of a most exquisite flavour. The seeds are formed in several parts of the pulp, and are somewhat flat. The tree is high and tufted, the stem large and round, but with some inequalities, full of elliptic leaves, terminating in a point. The blossom differs little from the colour of the leaves, which is a darkish green; and though far from being beautiful, is remarkable for its incomparable fragrance.

The *granadilla* in its shape resembles an hen's egg, but is larger. The outside of the shell is smooth, glossy, and of a faint carnation colour, and the inside white and soft. The shell contains a viscous liquid substance full of very small and delicate grains, less hard than those of the pomegranate. This medullary substance is separated from the shell by a fine and transparent membrane. Its fruit has a delightful sweetness blended with acidity, very cordial and refreshing, and so wholesome, that there is no danger of eating to excess.

The *frutilla*, or Peruvian strawberry, is very different from that of Europe in size; for though they are here generally not above an inch in length, they are much larger in other parts of Peru; but their taste, though juicy, and not unpalatable, is not equal to those in Europe.

The country is observed to abound more in women than in men, which is the more remarkable, as those causes which induce men to leave their country, as travelling, commerce, and war, naturally bring over more men from Europe than women. But there are many families in which there are a number of daughters, without one son among them. The women enjoy a better state of health than the men, which may be owing in some measure to the climate, and more particularly to the early intemperance and voluptuousness of the other sex.

The Creoles are well made, of a proper stature, and of a lively and agreeable countenance. The *Mestizos* are also in general well made, often taller than the ordinary

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48
Inhabitants.

Peru.

dinary size, very robust, and have an agreeable air. The Indians, both men and women, are commonly low of stature, though strong and well proportioned: but more natural defects are to be found among them than in any of the rest. Some are remarkably short, some idiots, dumb, or blind. Their hair is generally thick and long, which they wear loose on their shoulders; but the Indian women plait theirs behind with a ribbon, and cut that before a little above the eye brows, from one ear to the other. The greatest disgrace that can be offered to an Indian of either sex is to cut off their hair; for whatever corporal punishment their masters think proper to inflict on them, they bear with patience; but this affront they never forgive; and accordingly the government has interposed, and limited this punishment to the most enormous crimes. The colour of the hair is generally a deep black: it is lank, harsh, and as coarse as that of a horse. On the contrary, the male Mestizos, in order to distinguish themselves from the Indians, cut off their hair; but the females do not adopt that custom.

49
Their dress.

The Mestizos in general wear a blue cloth, manufactured in this country; but though they are the lowest class of Spaniards, they are very ambitious of distinguishing themselves as such, either by the colour or fashion of the clothes they wear.

The Mestizo women affect to dress in the same manner as the Spanish, though they cannot equal the ladies in the richness of their stuffs. The meaner sort wear no shoes; but, like the men of the same rank, go barefooted.

The dress of the Indians consists of white cotton drawers, which hang down to the calf of the leg, where they are loose, and edged with a lace suitable to the stuff. The use of a shirt is supplied by a black cotton frock, made in the form of a sack, with three openings at the bottom, one in the middle for the head, and others at the corners for the arms; thus covering their naked bodies down to the knees. Over this is a serge cloak, with a hole in the middle for putting the head through, and a hat made by the natives. This is their general dress, which they never lay aside, even while they sleep; and they have no additional clothing for their legs or feet. The Indians, who have acquired some fortune, particularly the barbers and phlebotomists, distinguish themselves from their countrymen by the fineness of their drawers, and by wearing a shirt, which, though without sleeves, has a lace four or five fingers in breadth, fastened round like a kind of ruff or band. They are fond of silver or gold buckles to their shoes, though they wear no stockings; and instead of a mean serge cloak, wear one of fine cloth, which is often adorned with gold or silver lace.

There are two kinds of dresses worn by the Indian women, made in the same plain manner with those worn by the men in general, the whole consisting of a short petticoat and a veil of American baize. But the dress of the lowest class of Indian women is only a bag of the same make and stuff as that of the men, which they fasten on their shoulders with two large pins: it reaches down to the calf of the leg, and is fastened round the waist with a kind of girdle. Instead of a veil, they wear about the neck a piece of the same

coarse stuff, dyed black; but their arms and legs are naked. Peru.

The people have dishes unknown in Europe; but are particularly fond of cheese; and have excellent butter in the neighbourhood of Quito. Sweetmeats are very much admired. Food and drink, &c.

Rum is commonly drank here by persons of all ranks, but their favourite liquor is brandy. The disorders arising from the excessive use of spirituous liquors are chiefly seen among the Mestizos; and the lower class of women, both among the Creoles and Mestizos, are also extremely addicted to the same species of debauchery.

Another liquor much used in this country is mate, which is made of an herb known in all these parts of America by the name of Paraguay, as being the produce of that country. Some of it is put into a calabash tipped with silver, called here *mate*, with sugar and some cold water. After it has continued there some time, the calabash is filled with boiling water, and they drink the liquor through a pipe fixed in the calabash. It is also usual to squeeze into the liquor a small quantity of the juice of lemons or Seville oranges, mixed with some perfumes from odoriferous flowers. This is their usual drink in the morning fasting, and many use it also at their evening regale. The manner of drinking it appears very indelicate, the whole company taking it successively through the same pipe, it being carried several times round the company till all are satisfied. This among the Creoles is the highest enjoyment: so that when they travel, they never fail to carry with them a sufficient quantity of it, and till they have taken their dose of mate they never eat.

The vice of gaming is here carried to an extravagant height, to the ruin of many families, some losing their stocks in trade, others the very clothes from their backs, and afterward those belonging to their wives, which they hazard, stimulated by the hope of recovering their own.

The common people, the Indians, and even the domestics, are greatly addicted to stealing. The Mestizos, though arrant cowards, do not want audacity in this way; for though they will not venture to attack any one in the street, it is a common practice to snatch off a person's hat, and immediately seek their safety in flight. This acquisition is sometimes of considerable value; the hats worn by persons of rank, and even by the wealthy citizens when dressed, being of white beaver, worth fifteen dollars, beside the hatband of gold or silver lace, fastened with a gold buckle set with diamonds or emeralds. Robberies on the highway are seldom heard of.

In Quito, and all the towns and villages of its province, different dialects are spoken, Spanish being no less common than the Inga, the language of the country. The Creoles use the latter as much as the former, but both are considerably adulterated by borrowed words and expressions. The first language generally spoken by children is the Inga; for the nurses being Indians, many of them do not understand a word of Spanish, and thus they afterward learn a jargon composed of both languages. Language.

The sumptuous manner of performing the last offices for the dead, demonstrates how far the power of the habit paid the dead.

Peru. habit is capable of prevailing over reason and prudence, for their ostentation is so great in this particular, that many families of credit are ruined by preposterously endeavouring to excel others; and the people here may be said to toil and scheme to lay up wealth, to enable their successors to lavish honours upon a body insensible of all pageantry.

53
Commerce.

The commerce of the province of Quito is chiefly carried on by Europeans settled here, and others who occasionally arrive. The manufactures of this province are only cottons, some white and striped baize, and cloths, which meet with a good market at Lima, for supplying the inward provinces of Peru. The returns are made partly in silver, and partly in fringes made of gold and silver thread, and wine, brandy, oil, copper, tin, lead, and quicksilver. On the arrival of the galleons at Cartagena, these traders resort thither to purchase European goods, which, at their return, they consign to their correspondents all over the province. The coasts of New Spain supply this province with indigo, of which there is a very large consumption at the manufactures, blue being universally the colour which this people adopt for their apparel. They also import, by way of Guayaquila, iron and steel both from Europe and the coast of Guatemala.

54
Disposition
of the in-
habitants.

The disposition of the Indians in the province of Quito is extremely remarkable, and they appear to have no resemblance to the people found there by those who first discovered the country. They at present possess a tranquillity not to be disturbed either by fortunate or unfortunate events. In their mean apparel they are as contented as a prince clothed in the most splendid robes. They show the same disregard to riches; and even the authority and grandeur within their reach is so little the object of their ambition, that to all appearance it seems to be the same to an Indian whether he be created an alcalde or obliged to perform the office of a common executioner.

Their sloth is so great, that scarcely any thing can induce them to work. Whatever therefore is necessary to be done is left to the Indian women, who are much more active; they spin and make the half shirts and drawers which form the only apparel of their husbands; they cook the provisions, grind barley, and brew the beer called *chicha*; while the husband sits squatting on his hams, the usual posture of the Indians, looking at his busy wife. The only domestic service they do is to plough their little spot of land, which is sowed by the wife. When they are once seated on their hams, no reward can induce them to stir; so that if a traveller has lost his way, and happens to come to one of their cottages, they charge their wives to say that they are not at home. Should the passenger alight and enter the cottage, the Indian would still be safe; for having no light but what comes through a hole in the door, he could not be discovered; and

Peru. should the stranger even see the Indian, neither entreaties nor rewards would prevail on him to stir a step with him.

They are lively only in parties of pleasure, rejoicings, entertainments, and especially dancing; but in all these the liquor must circulate briskly, and they continue drinking till they are entirely deprived both of sense and motion.

It is remarkable that the Indian women, whether maids or married, and Indian young men before they are of an age to contract matrimony, are never guilty of this vice: it being a maxim among them, that drunkenness is the privilege of none but masters of families, who, when they are unable to take care of themselves, have others to take care of them.

The women present the *chicha* (A) to their husbands in calabashes, till their spirits are raised; then one plays on a pipe and tabor, while others dance. Some of the best voices among the Indian women sing songs in their own language, and those who do not dance, squat down in the usual posture till it comes to their turn. When tired with intemperance, they all lie down together, without regarding whether they be near the wife of another or their own sister or daughter. These festivities sometimes continue three or four days, till the priest coming among them, throws away all the *chicha*, and disperses the Indians, lest they should procure more.

Their funerals are likewise solemnized with excessive drinking. The house is filled with jugs of *chicha*, for the solace of the mourners and other visitors; the latter even go out into the streets, and invite all of their nation who happen to pass by to come in and drink to the honour of the deceased. This ceremony lasts four or five days, and sometimes more, strong liquor being their supreme enjoyment.

The Indians in the audience of Quito are said to act ⁵⁵ Their manner of contracting marriages. contrary to all other nations in their marriages; for they never make choice of a woman who has not been first enjoyed by others, which they consider as a certain indication of her personal attractions. After a young man has made choice of a woman, he asks her of her father, and having obtained his consent, they begin to cohabit together as man and wife, and assist the father-in-law in cultivating the land. At the end of three or four months, and frequently of a year, the husband leaves his bride or wife without any ceremony; and perhaps expostulates with his father-in-law for endeavouring to deceive him, by imposing upon him his daughter, whom nobody else had thought worthy of making a bedfellow. But if no disgust arises in the man on this account or any other, after passing three or four months in this commerce, which they call *amanarse*, or to habituate one's self, they then marry. This custom is still very common, though the whole body of the clergy have used all their endeavours to put a stop to it. Accordingly they always absolve.

(A) This is a liquor made from maize by the following process. The maize, after being soaked in water till it begin to grow, is dried in the sun, then parched a little, and at last ground. The flour, after it has been well kneaded, is put with water into a large vessel, and left for two or three days to ferment. Its taste is nearly that of the most indifferent kind of cyder. It is a refreshing, nourishing, and aperitive liquor; but it will not keep above eight days without turning sour.

Peru.
56
Appear-
ance of the
country in
this pro-
vince.

absolve them of that sin before they give them the nuptial benediction.

It has been observed, that the dependencies of the jurisdictions of Quito are seated between the two Cordilleras of the Andes, and that the air is more or less cold, and the ground more or less sterile, according to the height of the mountains. These barren tracks are called deserts; for though all the Cordilleras are dry, some are much more so than others; and the continual snow and frosts render some parts of them incapable of producing a single plant, and consequently they are uninhabitable by man or beast.

Some of these mountains, which appear to have their bases resting on other mountains, rise to a most astonishing height, and, reaching far above the clouds, are here, although in the midst of the torrid zone, covered with perpetual snow. From experiments made with a barometer on the mountain of Cotopaxi, it appeared that its summit was elevated 6252 yards above the surface of the sea, something above three geographical miles, which greatly exceeds the height of any other mountain in the known world.

Cotopaxi became a volcano about the time when the Spaniards first arrived in this country. A new eruption happened in 1743, which had been for some days preceded by a continual interior rumbling noise; after which an aperture was made in its summit, as also three others near the middle of its declivity; these parts, when the eruption commenced, were buried under prodigious masses of snow. The ignited substances which were ejected being mingled with a considerable quantity of snow and ice, melting amidst the flames, were carried down with such amazing rapidity, that the plain from Callo to Latacunga was overflowed, and all the houses with their wretched inhabitants were swept away in one general and instantaneous destruction. The river of Latacunga was the receptacle of this dreadful flood, till becoming swollen above its banks, the torrent rolled over the adjacent country, continuing to sweep away houses and cattle, and rendered the land near the town of the same name as the river one vast lake. Here, however, the inhabitants had sufficient warning to save their lives by flight, and retreated to a more elevated spot at some distance. During three days the volcano ejected cinders, while torrents of lava with melted ice and snow poured down the sides of the mountain. The eruption continued for several days longer, accompanied with terrible roarings of the wind, rushing through the craters which had been opened. At length all was quiet, and neither smoke nor fire were to be seen; until in May 1744 the flames forced a passage through several other parts on the sides of the mountain; so that in clear nights the flames, being reflected by the transparent ice, exhibited a very grand and beautiful illumination. On the 13th of November following, it ejected such prodigious quantities of fire and lava, that an inundation equal to the former soon ensued, and the inhabitants of the town of Latacunga for some time gave themselves over for lost.

The most southern mountains of the Cordilleras is that of Mecas or Sangay, which is of a prodigious height, and the far greatest part of it covered with snow; yet from its summit issues a continual fire, attended with explosions which are plainly heard at 40

leagues distance. The country adjacent to this volcano is entirely barren, being covered with cinders ejected from its mouth. In this mountain rises the river Sangay, which being joined by the Upano, forms the Payra, a large river which discharges itself into the Marañon.

Pichincha, though famous for its great height, is 1278 yards lower than the perpendicular height of Cotopaxi, and was formerly a volcano, but the mouth or crater on one of its sides is now covered with sand and calcined matter; so that at present neither smoke nor fire issue from it. When Don George Juan and Don Antonio de Ulloa were stationed on it for the purpose of making astronomical observations, they found the cold on the top of this mountain extremely intense, the wind violent, and they were frequently involved in so thick a fog, or, in other words, a cloud, that an object at six or eight paces distance was scarcely discernible. The air grew clear, by the clouds moving nearer to the earth, and on all sides surrounding the mountain to a vast distance, representing the sea with the mountain standing like an island in the centre. When this happened, they heard the dreadful noise of the tempests that discharged themselves on Quito and the neighbouring country. They saw the lightning issue from the clouds, and heard the thunder roll far beneath them. While the lower parts were involved in tempests of thunder and rain, they enjoyed a delightful serenity; the wind was abated, the sky clear, and the enlivening rays of the sun moderated the severity of the cold. But when the clouds rose, their thickness rendered respiration difficult: snow and hail fell continually, and the wind returned with all its violence; so that it was impossible entirely to overcome the fear of being, together with their hut, blown down the precipice on whose edge it was built, or of being buried in it by the constant accumulations of ice and snow. Their fears were likewise increased by the fall of enormous fragments of rocks. Though the smallest crevice visible in their hut was stopped, the wind was so piercing that it penetrated through; and though the hut was small, crowded with inhabitants, and had several lamps constantly burning, the cold was so great, that each individual was obliged to have a chafing dish of coals, and several men were constantly employed every morning to remove the snow which fell in the night. By the severities of such a climate their feet were swelled, and so tender that walking was attended with extreme pain, their hands covered with chilblains, and their lips so swelled and chapt that every motion in speaking drew blood.

The next division of Peru is the audience of Lima, ⁵⁷ Province of Lima, which is bounded on the north by Quito, on the east by the Cordilleras of the Andes, on the south by the audience of Los Charcos, and on the west by the Pacific Ocean, it being about 770 miles in length from north to south, but of an unequal breadth.

The climate and soil of this country is uncommonly ⁵⁸ Climate, various; in some places it is exceedingly hot, in others soil, &c. insupportably cold, and in the city of Lima, where in this province rain never falls, it is always temperate. The seasons vary within the compass of a few miles, and in certain parts of the audience all the vicissitudes of weather are experienced in 24 hours. It is extremely remarkable that no rains fall or rivers flow on the sea-coasts, tho'

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the country is refreshed by thick fogs, and the heat abated by dense clouds that never condense into showers. This phenomenon has drawn the attention of many naturalists, without their being able satisfactorily to account for it.

Spring begins toward the close of the year, that is about the end of November or the beginning of December, when the vapours which fill the atmosphere during the winter subside, and the sun, to the great joy of the inhabitants, again appears, and the country then begins to revive, which, during the absence of his rays, had continued in a state of languor. This is succeeded by summer, which, though hot from the perpendicular direction of the sun's rays, is far from being insupportable; the heat, which indeed would otherwise be excessive, being moderated by the south winds, which always blow at this season, though with no great force. Winter begins at the latter end of June or the beginning of July, and continues till November or December, when the south winds begin to blow stronger, and to produce a certain degree of cold, not indeed equal to that in countries where ice and snow are known, but so keen that the light dresses are laid by, and cloth or other warm stuffs worn. During the winter the earth is covered with so thick a fog, as totally to intercept the rays of the sun; and the winds, by blowing under the shelter of this fog, retain the particles they contracted in the frozen zone. In this season only the vapours dissolve into a very small dew, which everywhere equally moistens the earth; by which means all the hills, which during the other parts of the year offer nothing to the sight but rocks and wastes, are clothed with verdure and enamelled with flowers of the most beautiful colours. These dews never fall in such quantities as to impair the roads or incommode the traveller; a very thin stuff will not soon be wet through; but the continuance of the mists during the whole winter, without being exhaled by the sun, fertilizes every part of the country.

Lima is as free from tempests as from rain; so that those of the inhabitants who have neither visited the mountains nor travelled into other parts, are absolute strangers to thunder and lightning, and are therefore extremely terrified when they first hear the former or see the latter. But it is very remarkable, that what is here entirely unknown should be so common 30 leagues to the east of Lima; it being no farther to the mountains, where violent rains and tempests of thunder and lightning are as frequent as at Quito.

But though the capital is freed from the terror of these tempests, it is subject to what is much more dreadful. Earthquakes happen here so frequently, that the inhabitants are under continual apprehensions of being, from their suddenness and violence, buried in the ruins of their own houses: yet these earthquakes, though so sudden, have their presages, one of the principal of which is a rumbling noise in the bowels of the earth about a minute before the shocks are felt, that seems to pervade all the adjacent subterraneous part; this is followed by dismal howlings of the dogs, who seem to presage the approaching danger. The beasts of burden passing the streets stop, and by a natural instinct spread open their legs, the better to secure themselves from falling. On these portents the terrified inhabitants fly from their houses into the streets with such

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precipitation, that if it happens in the night they appear quite naked; the urgency of the danger at once banishing all sense of delicacy or shame. Thus the streets exhibit such odd and singular figures as might afford matter of diversion, were it possible to be diverted in so terrible a moment. This sudden concourse is accompanied with the cries of children waked out of their sleep, blended with the lamentations of the women, whose agonizing prayers to the saints increase the common fear and confusion. The men are also too much affected to refrain from giving vent to their terror; so that the whole city exhibits a dreadful scene of consternation and horror.

The earthquakes that have happened at the capital are very numerous. The first since the establishment of the Spaniards was in 1582; but the damage was much less considerable than in some of the succeeding. Six years after Lima was again visited by another earthquake, so dreadful, that it is still solemnly commemorated every year. In 1609 another happened, which overturned many houses. On the 27th of November 1630, such prodigious damage was done in the city by an earthquake, that, in acknowledgment of its not having been entirely demolished, a festival on that day is annually celebrated. Twenty-four years after, on the 3d of November, the most stately edifices in the city, and a great number of houses, were destroyed by an earthquake; but the inhabitants retiring, few of them perished. Another dreadful one happened in 1678; but one of the most terrible was on the 28th of October 1687. It began at four in the morning, and destroyed many of the finest public buildings and houses, in which a great number of the inhabitants perished; but this was little more than a prelude to what followed; for two hours after the shock returned with such impetuous concussions, that all was laid in ruins, and the inhabitants felt themselves happy in being only spectators of the general devastation, by having saved their lives, though with the loss of all their property. During this second shock, the sea retiring considerably, and then returning in mountainous waves, entirely overwhelmed Callao, which is at five miles distance from Lima, and all the adjacent country, together with the miserable inhabitants. From that time six earthquakes have happened at Lima previous to that of 1746. This last was on the 28th of October, at half an hour after ten at night, when the concussions began with such violence, that in little more than three minutes the greatest part, if not all the buildings in the city, were destroyed, burying under their ruins those inhabitants who had not made sufficient haste into the streets and squares, the only places of safety. At length the horrible effects of the first shock ceased; but the tranquillity was of short duration, the concussions swiftly succeeding each other. The fort of Callao also sunk into ruins; but what it suffered from the earthquake in its building was inconsiderable, when compared to the dreadful catastrophe which followed; for the sea, as is usual on such occasions, receding to a considerable distance, returned in mountainous waves, foaming with the violence of the agitation, and suddenly buried Callao and the neighbouring country in its flood. This, however, was not entirely effected by the first swell of the waves; for the sea retiring farther, returned with still greater impetuosity, and covered both

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the walls and other buildings of the place; so that what even had escaped the first inundation was totally overwhelmed by those succeeding mountainous waves. Twenty-three ships and vessels, great and small, were then in the harbour, 19 of which were sunk, and the other 4, among which was a frigate named St Fermin, were carried by the force of the waves to a considerable distance up the country. This terrible inundation and earthquake extended to other parts on the coast, and several towns underwent the same fate as the city of Lima; where the number of persons who perished within two days after it began, amounted, according to the bodies found, to 1300, beside the maimed and wounded, many of whom lived only a short time in great torture.

The country of Lima enjoys great fertility, producing all kinds of grain and a prodigious variety of fruit. Here industry and art supply that moisture which the clouds withhold. The ancient Incas of Peru caused small canals to be formed, in order to conduct the waters of the rivers to every part of the country. The Spaniards, finding these useful works executed to their hands, had only to keep them in order; and by these are watered spacious fields of barley, large meadows, plantations, vineyards, and gardens, all yielding uncommon plenty. Lima differs from Quito, where the fruits of the earth have no determined season; for here the harvest is gathered in, and the trees drop their leaves in the proper season.

Although the summer here is hot, yet venomous creatures are unknown; and the same may be said of the territory called *Valles*, though here are some ports, as Tumbes and Piura, where the heat is almost as great as that of Guayaquil. This singularity can therefore proceed from no other cause than the natural drought of the climate.

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Divisions
of the au-
dience of
Lima.

The audience of Lima is divided into four bishoprics, Truxillo, Guamanga, Cusco, and Arequipa. The diocese of Truxillo lies to the north of the archiepiscopal diocese of Lima, and like all the others is divided into several jurisdictions. The city of Truxillo is seated in 8° 6' south latitude, in a pleasant situation, though in a sandy soil.

In the diocese of Guamanga is a rich quicksilver mine, from which the inhabitants of a neighbouring town procure their whole subsistence; the coldness of the air in that place checking the growth of all kinds of grain and fruit, so that they are obliged to purchase them from their neighbours. The quicksilver mines wrought here supply all the silver mines in Peru with that necessary mineral, and notwithstanding the prodigious quantities already extracted, no diminution is perceived.

Cusco, which gives name to another diocese, is the most ancient city Peru, being of the same date with the empire of the Incas, and was founded by them as the capital of the empire. On the mountain contiguous to the north part of the city are the ruins of a famous fort built by the Incas; whence it appears that their design was to inclose the whole mountain with a prodigious wall, of such construction as to render its ascent absolutely impracticable to an enemy, in order to prevent all approach to the city. This wall was entirely of freestone, and strongly built, some of the stones being of a prodigious magnitude. The city of Cusco is nearly equal to that of Lima. See Cusco.

In this bishopric are several mines of gold and silver, that are extremely rich.

The fourth diocese of the audience of Lima is Arequipa, which contains the city of the same name, one of the largest in all Peru. It is delightfully seated in a plain; the houses are well built of stone, and are generally lofty, commodious, finely decorated on the outside, and neatly furnished within. The temperature of the air is extremely agreeable, the cold being never excessive, nor the heat troublesome; so that the fields are always clothed with verdure, and enamelled with flowers, as in a perpetual spring. But these advantages are allayed by its being frequently exposed to dreadful earthquakes; for by these convulsions of nature it has been four times laid in ruins. The city is, however, very populous, and among its inhabitants are many noble families.

In this bishopric are several gold and silver mines, and in some parts are large vineyards, from which considerable quantities of wine and brandy are made. Among the other productions is Guinea pepper, in which the jurisdiction of Africa in this diocese carries on a very advantageous trade, the annual produce of these plantations bringing in no less than 60,000 dollars *per annum*. The pods of this pepper are about a quarter of a yard in length, and when gathered are dried in the sun and packed up in bags of rushes, each bag containing an aroba or a quarter of a hundred weight, and thus they are exported to all parts. Other places of this jurisdiction are famous for vast quantities of large and excellent olives, far exceeding the finest produced in Europe, they being nearly the size of a hen's egg.

The audience of Charcas, the last division of Peru, is equal in extent to that of Lima; but many of its parts are not so well inhabited, some being full of vast deserts and impenetrable forests, while others have extensive plains intercepted by the stupendous height of the Cordilleras: the country is inhabited only in such parts as are free from those inconveniences. It is bounded on the north by the diocese of Cusco, and reaches southward to Buenos Ayres; on the east it extends to Brasil; and on the west it reaches to the Pacific Ocean, particularly at Atacama. The remainder of the province borders on the kingdom of Chili.

This audience is divided into the archbishopric of Plata, and five bishoprics. We shall begin with the former.

The famous mountain of Potosi is known all over the commercial world for the immense quantity of silver it has produced. The discovery of this amazing treasure happened at the commencement of the year 1545, by a mere accident, which we shall mention afterwards. At a small distance from it are the hot medicinal baths, called *Don Diego*, whither some resort for health and others for diversion.

At the time when the first conquests were made, when emigrations were most frequent, the country of the Incas had a much greater reputation for riches than New Spain; and, in reality, for a long time much more considerable treasures were brought away from it. The desire of partaking of them must necessarily draw thither, as was really the case, a greater number of Castilians. Though almost all of them went over thither with the hope of returning to their country to enjoy

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The au-
dience of
Charcas.

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Divisions,
&c. of this
audience.

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How the
country
was at first
settled by
the Spaniards.

Peru. enjoy the fortune they might acquire, yet the majority settled in the colony. They were induced to this by the softness of the climate, the salubrity of the air, and the goodness of the provisions. Mexico presented not the same advantages, and did not give them reason to expect so much independence as a land infinitely more remote from the mother-country.

Cusco attracted the conquerors in multitudes. They found this capital built on a ground that was very irregular, and divided into as many quarters as there were provinces in the empire. Each of the inhabitants might follow the usages of his native country; but every body was obliged to conform to the worship established by the founder of the monarchy. There was no edifice that had any grandeur, elegance, or convenience; because the people were ignorant of the first elements of architecture. The magnificence of what they called the *palace of the sovereign, of the princes of the blood, and of the great men of his empire*, consisted in the profusion of the metals that were lavished in decorating them. The temple of the Sun was distinguished above all other edifices; its walls were incrust-ed or sheathed with gold and silver, ornamented with divers figures, and loaded with the idols of all the nations whom the Incas had enlightened and subdued.

As it was not a solicitude for their own preservation which occupied the Spaniards at first, they had no sooner pillaged the immense riches which had been amassed at Cusco for four centuries, than they went in great numbers in 1534, under the order of Sebastian de Benalcazar, to undertake the destruction of Quito. The other towns and boroughs of the empire were over-run with the same spirit of rapine; and the citizens and the temples were plundered in all parts.

Those of the conquerors, who did not take up their residence in the settlements which they found already formed, built towns on the sea-coasts, where before there were none: for the sterility of the soil had not permitted the Peruvians to multiply much there; and they had not been induced to remove thither from the extremity of their country, because they sailed very little. Paita, Truxillo, Callao, Pisca, and Arica, were the roads which the Spaniards deemed most convenient for the communication they intended to establish among themselves and with the mother-country. The different positions of these new cities determined the degree of their prosperity.

Those which were afterwards built in the inland parts of the country were not erected in regions which presented a fertile soil, copious harvests, excellent pastures, a mild and salubrious climate, and all the conveniences of life. These places, which had hitherto been so well cultivated by a numerous and flourishing people, were now totally disregarded. Very soon they exhibited only a deplorable picture of a horrid desert; and this wildness must have been more melancholy and hideous than the dreary aspect of the earth before the origin of societies. The traveller, who was led by accident or curiosity into these desolate plains, could not forbear abhorring the barbarous and bloody authors of such devastations, while he reflected that it was not owing even to the cruel illusions of glory, and to the fanaticism of conquest, but to the stupid and abject desire of gold, that they had sacrificed so much more real treasure, and so numerous a population.

This insatiable thirst of gold, which neither tended to subsistence, safety, nor policy, was the only motive for establishing new settlements, some of which have been kept up, while several have decayed, and others have been formed in their stead. The fate of them all has corresponded with the discovery, progress, or declension, of the mines to which they were subordinate.

Fewer errors have been committed in the means of procuring provisions. The natives had hitherto lived hardly on any thing else but maize, fruits, and pulse, for which they had used no other seasoning except salt and pimento. Their liquors, which were made from different roots, were more diversified: of these the *chica* was the most usual; but the conquerors were not satisfied either with the liquors or with the food of the people they had subdued. They imported vines from the Old World, which soon multiplied sufficiently in the sands of the coasts at Ica, Pisca, Nasca, Moquequa, and Truxillo, to furnish the colony with the wine and brandy it wanted. Olives succeeded still better; and yielded a great abundance of oil, which was much superior to that of the mother-country. Other fruits were transplanted with the same success. Sugar succeeds so well, that none of any other growth can be compared to that which is cultivated in those parts, where it never rains. In the inland country wheat and barley were sown; and at length all the European quadrupeds were soon found grazing at the foot of the mountains.

This was a considerable step; but there still remained much more to be done. After they had provided for a better and a greater choice of subsistence, the next care of the Spaniards was to have a dress more commodious and more agreeable than that of the Peruvians. These were, however, better clothed than any other American nation. They owed this superiority to the advantage which they alone possessed, of having the LAMA and PACOS, domestic animals which served them for this use. See CAMELUS.

After the conquest, all the Indians were obliged to wear clothes. As the oppression under which they groaned did not allow them to exercise their former industry, they contented themselves with the coarser cloths of Europe, for which they were made to pay an exorbitant price. When the gold and silver which had escaped the rapacity of the conquerors were exhausted, they thought of re-establishing their national manufactures. These were some time after prohibited, on account of the deficiency which they occasioned in the exports of the mother-country. The impossibility which the Peruvians found of purchasing foreign stuffs and paying their taxes, occasioned permission to be given at the end of ten years for their re-establishment. They have not been discontinued since that time; and have been brought to as great a degree of perfection as it was possible they could be under a continual tyranny.

With the wool of the vicuna, a species of wild pa-cos, they make, at Cusco and in its territory, stockings, handkerchiefs, and scarfs. These manufactures would have been multiplied, if the spirit of destruction had not fallen on animals as well as on men. The same wool, mixed with that of the sheep imported thither from Europe, which have exceedingly degenerated,

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Peru. serves for carpets, and makes also tolerably fine cloth. Fleeces of inferior quality are employed in serges, druggets, and in all kinds of coarse stuffs.

The manufactures subservient to luxury are established at Arequipa, Cusco, and Lima. In these three towns is made a prodigious number of gold toys and plate, for the use of private persons, and also for the churches. All these manufactures are but coarsely wrought, and mixed with a great deal of copper. We seldom discover more taste in their gold and silver laces and embroideries which their manufactures also produce. This is not altogether the case in regard to their lace, which, when mixed with that of Europe, looks very beautiful. This last manufacture is commonly in the hands of the nuns, who employ in it the Peruvian girls, and the young Mettees of the towns, who for the most part before marriage pass some years in the convent.

Other hands are employed in painting and gilding leather for rooms, in making with wood and ivory pieces of inlaid work and sculpture, and in drawing figures on the marble that is found at Cucuca, or on linen imported from Europe. These different works, which are almost all manufactured at Cusco, serve for ornaments for houses, palaces, and temples: the drawing of them is not bad, but the colours are neither exact nor permanent. If the Indians, who invent nothing, but are excellent imitators, had able masters and excellent models, they would at least make good copyists. At the close of the last century, some works of a Peruvian painter, named *Michael de St Jacques*, were brought to Rome; and the connoisseurs discovered marks of genius in them.

Though the Peruvians were unacquainted with coin, they knew the use of gold and silver; for they employed them in different kinds of ornaments. Independent of what the torrents and accident procured them of these metals, some mines had been opened of little depth. The Spaniards have not transmitted to us the manner in which these rich productions were drawn from the bosom of the earth. Their pride, which has deprived us of so much useful knowledge, undoubtedly made them think, that, in the inventions of a people whom they called *barbarous*, there was nothing that was worthy to be recorded.

The difference as to the manner in which the Peruvians worked their mines, did not extend to the mines themselves. The conquerors opened them on all sides. At first the gold mines tempted the avarice of the greater number. Fatal experience discouraged those whom passion had not blinded. They clearly saw, that, for some enormous fortunes raised in this manner, great numbers, who had only moderate fortunes, were totally ruined. These mines sunk into such discredit, that, in order to prevent them from being abandoned, the government was obliged to take the 20th part of their produce, instead of the fifth which it at first received.

The mines of silver were more common, more equal, and richer. They even produced silver of a singular species, rarely found elsewhere. Towards the sea-coast, great lumps of this metal are found in the sands.

There are a great number of other mines which are infinitely more important, and are found in the rocks

and on the mountains. Several of them gave false hopes. Such, in particular, was that of Ucuntaya, discovered in 1713. This was only an incrustation of almost massive silver, which at first yielded several millions, but was soon exhausted.

Others which were deeper have been alike deserted. Their produce, though equal to what it was originally, was not sufficient to support the expence of working them, which augmented every day. The mines of Quito, Cusco, and Arequipa, have experienced that revolution which awaits many of the rest.

There are greater numbers of very rich mines which the waters have invaded. The disposition of the ground, which from the summit of the Cordilleras goes continually shelving to the South Sea, must necessarily render these events more common at Peru than in other places. This inconvenience, which with greater care and skill might often have been prevented or diminished, has been in some instances remedied.

Joseph Salcedo, about the year 1660, had discovered, not far from the town of Puna, the mine of Laycacota. It was so rich, that they often cut the silver with a chisel. Prosperity had so elevated the mind of the proprietor, that he permitted all the Spaniards who came to seek their fortune in this part of the New World, to work some days on their own account, without weighing or taking any account of the presents he made them. This generosity drew around him an infinite number of people, whose avidity made them quarrel with each other, and the love of money made them take up arms and fall upon one another; and their benefactor, who had neglected no expedient to prevent and extinguish their sanguinary contentions, was hanged as being the author of them. Whilst he was in prison, the water got possession of his mine. Superstition soon made it imagined that this was a punishment for the horrid act they had perpetrated against him. This idea of divine vengeance was revered for a long time; but at last, in 1740, Diego de Bacna associated with other opulent people to avert the springs which had deluged so much treasure. The labours which this difficult undertaking required, were not finished till 1754. The mine yields as much now as it did at first. But mines still richer than this have been discovered. Such, for example, is that of Potosi, which was found in the same country where the Incas worked that of Porco.

An Indian, named *Hualpa*, in 1545, pursuing some deer, in order to climb certain steep rocks laid hold of a bush, the roots of which loosened from the earth, and brought to view an ingot of silver. The Indian had recourse to it for his own use; and never failed to return to his treasure every time that his wants or his desires solicited him to it. The change that had happened in his fortune was remarked by one of his countrymen, and he discovered to him the secret. The two friends could not keep their counsel and enjoy their good fortune. They quarrelled; on which the indiscreet confident discovered the whole to his master, Villaroell, a Spaniard who was settled in the neighbourhood. Upon this the mine became known, and was worked; and a great number of them were found in its vicinity; the principal of which are in the northern part of the mountain, and their direction is from north to south. The most intelligent people of Peru have observed,

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Peru. observed, that this is in general the direction of the richest mines.

The fame of what was passing at Potosi soon spread abroad; and there was quickly built at the foot of the mountain a town, consisting of 60,000 Indians and 10,000 Spaniards. The sterility of the soil did not prevent its being immediately peopled. Corn, fruit, flocks, American stuffs, European luxuries, arrived there from every quarter. Industry, which everywhere follows the current of money, could not search for it with so much success as at its source. It evidently appeared that in 1738 these mines produced annually near 978,000 l. without reckoning the silver which was not registered, and what had been carried off by fraud. From that time the produce has been so much diminished, that no more than one-eighth part of the coin which was formerly struck is now made.

At the mines of Potosi, and all the mines of South America, the Spaniards, in purifying their gold and silver, use mercury, with which they are supplied from Guanaca Velica. The common opinion is, that this mine was discovered in 1564. The trade of mercury was then still free: it became an exclusive trade in 1571. At this period all the mines of mercury were shut; and that of Guanaca Velica alone was worked, the property of which the king reserved to himself. It is not found to diminish. This mine is dug in a prodigiously large mountain, 60 leagues from Lima. In its profound abyss are seen streets, squares, and a chapel, where the mysteries of religion on all festivals are celebrated. Millions of flambeaux are continually kept to enlighten it.

Private people at their own expence work the mine of Guanaca Velica. They are obliged to deliver to government, at a stipulated price, all the mercury they extract from it. As soon as they have procured the quantity which the demands of one year require, the work is suspended. Part of the mercury is sold on the spot, and the rest is sent to the royal magazines throughout all Peru; from whence it is delivered out at the same price it is sold for in Mexico. This arrangement, which has occasioned many of the mines to drop, and prevented others from being opened, is inexcusable in the Spanish system. The court of Madrid, in this respect, merits the same reproaches as a ministry in other countries would incur, that would be blind enough to lay a duty on the implements of agriculture.

The mine of Guanaca Velica generally affects those who work in it with convulsions: this and the other mines, which are not less unhealthy, are all worked by the Peruvians. These unfortunate victims of an insatiable avarice are crowded all together and plunged naked into these abysses, the greatest part of which are deep, and all excessively cold. Tyranny has invented this refinement in cruelty, to render it impossible for any thing to escape its restless vigilance. If there are any wretches who long survive such barbarity, it is the use of cocoa that preserves them.

In the Cordilleras, near the city of Paz, is a mountain of remarkable height, called *Illimani*, which doubtless contains immense riches; for a crag of it being some years ago severed by a flash of lightning, and falling on a neighbouring mountain, such a quantity of gold was found in the fragments, that for some time that

metal was sold at Paz for eight pieces of eight *per* ounce; but its summit being perpetually covered with ice and snow, no mine has been opened in the mountain.

The city of La Paz is of a middling size, and from its situation among the breaches of the Cordilleras, the ground on which it stands is unequal, and it is also surrounded by mountains. When the river Titicaca is increased, either by the rains, or the melting of the snow on the mountains, its current forces along large masses of rocks with some grains of gold, which are found after the flood has subsided. Hence some idea may be formed of the riches inclosed in the bowels of these mountains; a remarkable proof of which appeared in the year 1730, when an Indian, washing his feet in the river, discovered so large a lump of gold, that the marquis de Castle Fuerte gave twelve thousand pieces of eight for it, and sent it as a present to the king of Spain.

Balsam of PERU. See MYROXILON.

PERUGIA, a town of Italy, in the pope's territories, and capital of Perugino. It is an ancient, handsome, populous, and large city, with a strong citadel, an university, and a bishop's see. The churches, and many other buildings as well public as private, are very handsome. It is seated on a hill, in E. Long. 12. 30. N. Lat. 43. 6.

PERUGINO, a province of Italy, in the territory of the church, bounded on the west by Tuscany, on the south by Orvietano, on the east by the duchies of Spoleto and Urbino, and on the north by the county of Citta Castellana. It is one of the smallest provinces in the territory of the church. The air is very pure, and the soil fertile in corn and good wine; besides, the lake Perugia supplies them with plenty of fish. The capital town is Perugia. The lake is eight miles from the city, and is almost round, being about five miles in diameter; in it there are three islands. This province is about 25 miles in length, and near as much in breadth.

PERUGINO. See MONTANINI.

PERUKE. See PERRUKE.

PERUVIAN BARK. See CINCHONA, and *Jesuits Bark*.

PERUVIANA, a general name given to that vast peninsula, extending itself from the isthmus of Darien to Cape Horn, in the form of a triangle, of which the *Terra Magellanica* and the Cape form the vertex. It includes the whole of South America, although, as is well known, all the countries included within these limits do not acknowledge the dominion of the crown of Spain. See *TERRA Firma*.

PESARO, a town of Italy, in the territory of the pope, and duchy of Urbino, with a bishop's see. It is a large place, whose streets are paved with bricks. The castle is very well fortified, the harbour excellent, and the cathedral church magnificent. The environs are remarkable for producing good figs, of which they send large quantities to Venice. It is seated on an eminence at the mouth of the river Fogha, on the Gulph of Venice. E. Long. 13. 0. N. Lat. 43. 56.

PESCARA, a very strong town in the kingdom of Naples, and in the Hither Abruzzo; seated at the mouth of a river of the same name, which falls into the

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Pescara.

Pescenius the Gulph of Venice. E. Long. 15. 2. N. Lat. 42. 27.

Petalism.

PESCENIUS NIGER. See **NIGER.**

PESCHIERA, a small but strong town of Italy, in the Veronese, with a castle, and a strong fort; seated on the river Mincio, or Menzo, which proceeds from the lake Garda. E. Long. 11. 4. N. Lat. 45. 27.

PESENAS, an ancient town of France, in Languedoc, and in the diocese of Agde; delightfully seated on the river Pein, 12 miles north-east of Beseirs, and eight north of Agde. E. Long. 3. 34. N. Lat. 43. 28.

PESSARY, in medicine, a solid substance composed of wool, lint, or linen, mixed with powder, oil, wax, &c. made round and long like a finger, in order to be introduced into the exterior neck of the matrix, for the cure of several uterine disorders.

PEST, a town of Upper Hungary, and capital of a county of the same name, seated on the Danube, in a fine plain, over-against Buda, 85 miles south-east of Presburg. E. Long. 18. 25. N. Lat. 47. 24.

PESTILENCE, in medicine, the same with the **PLAGUE.**

PETAGUEL, a territory of South America, in Brasil, bounded on the north by Dele; on the east by the sea; on the south by the captainship of Rio-Grande; and on the west by Tupuys. It contains mines of silver.

PETAL, in botany, one of the coloured leaves which compose the flower.

PETALISM, a mode of deciding on the guilt of citizens similar to the Athenian **OSTRACISM**. It was introduced in Syracuse about the year before Christ 460, in order to prevent the tyranny of the richer citizens, who had often about that time aimed at the diadem. To prevent, therefore, the evils daily arising from thence, and to bring down the aspiring minds of the wealthy citizens, the Syracusans were forced to make a law not unlike that of the Athenian ostracism; for as at Athens every citizen was to write on a shell the name of the person whom they conceived to be the most likely, on account of his wealth and adherents, to aspire to the crown; so at Syracuse they were to write on a leaf the names of such as they apprehended powerful enough to usurp the sovereignty. When the leaves were counted, he who had the most suffrages against him was, without any farther inquiry, banished for five years. This new-contrived method of impairing the estates, and weakening the interest of the overgrown citizens, was called *petalism*, from the Greek word *petalon*, which signifies "a leaf." This law was attended with many evil consequences; for those who were most capable of governing the commonwealth were driven out, and the administration of public affairs committed to the meanest of the people; nay, many of the chief citizens, who were able to render their country great service, fearing to fall under penalties of this law, withdrew from the city, and lived private in the country, not concerning themselves with public affairs: whence all the employments being filled with men of no merit or experience, the republic was on the brink of ruin, and ready to fall into a state of anarchy and confusion. The law therefore of petalism, upon more mature deliberation, was repealed soon after it had been first

enacted, and the reins of government were again put into the hands of men who knew how to manage them.

PETARD, in the art of war. See **GUNNERY**, no 56, and Plate CCXXIV.

PETAU (Denis), or *Dionysius PETAVIUS*, a French Jesuit of great erudition, born at Orleans in 1583. His father was a man of literature, and observing strong parts and an excellent genius for letters in his son, he took every means in his power to improve them. He used to tell his son, that he ought to qualify himself so, as to be able to attack and confound "the giant of the Allophylæ;" meaning that most eminent scholar Joseph Scaliger, whose abilities and learning were allowed to have done great honour and much service to the reformed. Young Petavius seems to have entered readily into his father's views; for he studied most intensely, and afterwards levelled much of his erudition against Scaliger. He joined the study of the mathematics to that of the belles lettres; and afterwards applied himself to a course of philosophy, which he began in the college of Orleans, and finished at Paris. He afterwards maintained theses in Greek, which was as familiar to him as Latin; and the Latin, it is said, he understood better than he did his own native language. When he was pretty well advanced, he had free access to the king's library, which he often visited on account of the Latin and Greek manuscripts. Among other advantages which accompanied his literary pursuits, was the friendship of Isaac Casaubon, whom Henry IV. called to Paris in 1600. It was at Casaubon's instigation, that Petavius, though then but very young, undertook an edition of *The Works of Synesius*. In this edition he corrected the Greek from the manuscripts, translated that part which yet remained to be translated into Latin, and wrote notes upon the whole. He was but 19 years of age when he was made professor of philosophy in the university of Bourges; and he spent the two following years in studying the ancient philosophers and mathematicians. In 1604, when Morel, professor of Greek at Paris, published *The Works of Chrysostom*, some part of Petavius's labours on Synesius were added to them: from the title of which we learn, that he then took the name of *Patus*, which he afterwards changed into *Petavius*. His own edition of *The Works of Synesius* did not appear till 1612.

He entered into the society of the Jesuits in 1605, and did great credit to it by his vast and profound erudition. He became a zealous advocate for the church of Rome; and there was no way of serving it more agreeable to him than that of criticising and abusing its adversaries. He was most bitter against Scaliger; nor did he even spare his friend Casaubon whenever he came in his way.—Petavius excelled particularly in the dark science of chronology; the learned world in general being obliged to him for some exact and nice disquisitions on this subject. His chief work, which is in great repute to this day, he intitled, *Rationarium Temporum*. It is an abridgement of universal history, from the earliest times to 1632, in chronological order, with references to proper authorities. It was improved, and several additions made to it, by Perizonius, and others after his death. This eminent father, after a very laborious life, died at Paris in the end of the year

Petard,
Petau.

Petau year 1652, aged 69. Gassendus, in his life of Perefchius, says he was the most consummate scholar the Jesuits ever had; an opinion very likely to be true, when we consider that he often contended successfully with Scaliger, Salmasius, and others, whose abilities have been universally acknowledged. His judgment, however, was not equal to his erudition, and his controversial writings are full of sourness and spleen. We have the following character of a great work of Petavius by an author of much celebrity, but who perhaps is as much biassed on the side of infidelity as he thinks this learned Jesuit was in favour of the church of Rome. The *Dogmata Theologica* of Petavius are a work of incredible labour and compass: the volumes which relate solely to the incarnation (two folios, 5th and 6th, of 837 pages) are divided into 16 books—the first of his history, the remainder of controversy and doctrine. The Jesuit's learning is copious and correct; his Latin is pure, his method clear, his argument profound and well connected: but he is the slave of the fathers, the scourge of heretics, and the enemy of truth and candour, as often as they are inimical to the Catholic cause.

PETAU, an ancient town of Germany, in the circle of Austria, and in Stiria. It is a handsome place, and is seated on the river Drave, 35 miles north-east of Cilley, and 109 south of Vienna. E. Long. 15. 36. N. Lat. 46. 40.

PETCHELI, a province of Asia, in China, and the chief in the whole empire; bounded on the east by the sea, on the north by the great wall, on the west by Chanfi, and on the south by Chantong and Honan. "This province contains nine cities of the first class, which have several others under their jurisdiction; these are about 40 in number, less considerable indeed, but all surrounded with walls and ditches. Petcheli has few mountains. Its soil is sandy, and produces very little rice; but all other kinds of grain abound there, as well as the greater part of the fruit-trees we have in Europe. It pays an annual tribute to the emperor, which, according to Father Martini, consists of 601,153 bags of rice, wheat, and millet; 224 pounds of linseed; 45,135 of spun silk; 13,748 of cotton; 8,737,248 trusses of straw for the horses belonging to the court, and 180,870 measures of salt, each containing 124 pounds; which is proportionably much inferior to that paid by other provinces.

"It is remarked that the people of this province have not the same aptitude for acquiring the sciences as those who inhabit the southern provinces of the empire; but they are more robust and warlike, and better calculated to endure the hardships and fatigue of war. This is the case with the Chinese of all the other northern countries.

"The face of the country here being flat and level, permits the use of a kind of carriage, the construction of which appears to be rather singular. Father Martini, one of the first missionaries in China, thus describes it: 'They use, in the province of Petcheli, a kind of chariot with one wheel, and constructed in such a manner, that there is room in the middle for only one person, who sits as if on horseback; the driver pushes behind, and, by means of wooden levers, makes the chariot advance with safety and expedition.

This has perhaps given rise to the report of chariots driven in that country by the wind, which the Chinese direct over land with sails, as they do ships at sea.' A French missionary, who traversed this province in 1768, seems to have made use of the same kind of carriage. 'We quitted the canal (says he) to travel in carts, which is customary in this part of China; but it is disagreeable beyond description. The cart is amazingly clumsy, and has a great resemblance to the carriage of a gun: there is room in it for only one person, who is frequently obliged to sit cross-legged, as our taylors do in Europe; it jolts prodigiously; and, while the traveller is exposed to the scorching rays of the sun, such clouds of dust sometimes arise as almost suffocate him.'

"The temperature of the air of this province does not seem to agree with its latitude. Although Petcheli extends no farther than to the 42d degree of north latitude, yet all the rivers there are so much frozen during four months in the year, that horses and waggons with the heaviest loads may safely pass them. It deserves to be remarked, that the whole body of ice is formed in one day, and that several are necessary to thaw only the surface. What may appear no less extraordinary is, that during these severe frosts one does not feel that sharp and pinching cold which accompanies the production of ice in Europe. These phenomena cannot be accounted for, but by attributing them to the great quantity of nitre which is found dispersed throughout this province, and to the serenity of the sky, which, even during winter, is seldom obscured by a cloud. The physical explanation, which we have given of this singular temperature, is fully confirmed by experiments lately made by Father Amiot at Peking, which convinced him, that in this capital and neighbourhood, as far as seven or eight leagues around, the water, air, and earth, equally abound with nitre.

"With regard to the water, the facility with which it freezes, the solidity of the ice and its duration, evidently announce the presence of nitre. A tub filled with water, placed near one of Rheamur's thermometers, had its surface immediately frozen, when the mercury stood only one degree above the freezing point; and when it stood three degrees below freezing, the water became a solid mass of ice, if the diameter of the vessel did not exceed a foot and a half, and the depth of the water four or five inches. This water, when the weather was fine, continued in the same state of congelation as long as the mercury in the thermometer did not rise higher than three degrees above 0; when the mercury rose higher, it then began to dissolve, but so slowly, that two or three days were scarcely sufficient to restore it to its former fluidity." Grosier goes on to relate other experiments of Father Amiot, which were made with a view to discover the cause of the water's freezing so in this temperate climate; and he then proceeds to tell us, that "if the waters of the province of Petcheli contain much nitre, it is no less certain, that the air which one breathes there is abundantly impregnated with it. The following are indubitable proofs of it: 1st, Notwithstanding unwholesome food, such as the flesh of the greater part of domestic animals that have died of old age or disease, which the people of this province greedily

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greedily devour, notwithstanding filth and all the inconveniences resulting from low, damp, and confined lodgings, where all the individuals of the same family are, as it were, heaped one upon another, the plague never makes its appearance in Petcheli; and the people are seldom attacked by any of those epidemical distempers which are so common in Europe. 2dly, Provisions of every kind may be kept at Peking a long while, without being subject to corruption. Raisins are eaten there fresh even in May, apples and pears till midsummer; wild boars, stags, deer, roebucks, rabbits, hares, pheasants, ducks, geese, and all kinds of game brought from Tartary to Peking after the commencement of winter; fish of every species, transported from the rivers of Leaotong—will keep without the assistance of salt, in their state of congelation, for two or three months, although they are exposed every day in the markets, carried from the markets to private houses, and from private houses brought back to the markets until they are all sold, which does not happen before the end of March. It is certain, that these facts announce an antiseptic quality in the air, which must undoubtedly proceed from the great quantity of nitre contained in it.

“3dly, The earth which forms the soil of Petcheli abounds no less with nitre; whole fields may be seen in the neighbourhood of Peking which are covered with it. Every morning at sunrise the country in certain cantons appears as white as if sprinkled by a gentle fall of snow. If a quantity of this substance be swept together, a great deal of kien, nitre, and salt, may be extracted from it. The Chinese pretend, that this salt may be substituted for common salt; however this may be, it is certain, that, in the extremity of the province towards Siuen-hoa-fou, poor people and the greater part of the peasants make use of no other. With regard to the kien procured from the earth, they use it for washing linen, as we do soap. Although the land of Petcheli is replete with nitrous particles, it does not, however, form dry deserts; it is cultivated with care, and becomes fruitful by incessant labour. The earth is frozen in winter to the depth of two or three feet, and does not become soft before the end of March. This may sufficiently explain why the frost kills plants in the neighbourhood of Peking, which Mr Linnæus raised in Sweden, although it is 20 degrees farther north than the capital of the Chinese empire.”

PETECHIÆ, in medicine, a name given to those spots, whether red or of any other colour, which appear in malignant fevers.

PETELIA. See STRONGOLI.

PETER (St), the apostle, born at Bethsaida, was son of John, Jona, or Joanna, and brother of St Andrew (John i. 42, 43.) His first name was Simon or Simeon; but when our Saviour called him to the apostleship, he changed his name into Cephas, that is, in Syriac, a stone or a rock; in Latin, *petra*, whence *Peter*. He was a married man; and had his house, his mother-in-law, and his wife, at Capernaum, upon the lake of Gennesareth (Mark i. 29. Mat. viii. 14. Luke iv. 38.) St Andrew, having been first called by Jesus Christ, met his brother Simon, and told him (John i. 41.) we have found the Messiah, and then brought him to Jesus. Jesus beholding him, said to

him, You are Simon son of Jona; henceforth you shall be called *Cephas*, that is, *stone* or *rock*. After having passed one day with our Saviour, they returned to their ordinary occupation, which was fishing. Yet it is thought they were present with him at the marriage of Cana in Galilee. This happened in the 30th year of the vulgar Christian era.

Towards the end of the same year, Jesus Christ being on the shore of the lake of Gennesareth, saw Peter and Andrew busy about their fishery, and washing their nets (Luke v. 1, 2, 3.) He entered into their boat, and bid Peter throw out his nets into the sea, in order to fish. Peter obeyed him, though he had already fished the whole night without catching any thing. They took so many fishes at this draught, that their own vessel, and that of James and John sons of Zebedee, were filled with them. Then Peter threw himself at the feet of Jesus, and said to him, Depart from me, Lord, for I am a sinner. Then Jesus said to them, Follow me, and I will make you *fishers of men*. He said the same thing to James and John; and immediately they quitted their boats and nets, and followed our Saviour.

Some time after, Jesus coming to Capernaum entered into the house of St Peter, where his mother-in-law lay sick of a fever. He immediately healed her, and she began to minister to him (Luke iv. 38. and Mat. viii. 14.) A little while before the feast of the passover of the following year, being the 32d of the vulgar era, after Jesus returned into Galilee, he made choice of twelve apostles, among which St Peter has always the first place (Mat. x. 2. Luke vi. 13.) One night that Jesus Christ walked upon the waters of the lake of Gennesareth, St Peter asked him leave to come and meet him (Mat. xiv. 28, 29.) Jesus gave him leave; but he seeing a great wave coming, was afraid, and therefore began to sink. Then Jesus held him up, and said, O man of little faith, why was you afraid? Afterwards landing on the other side of the lake, and the multitude that he had fed the day before beyond the lake being come to him at Capernaum, he spoke to them of his body and of his blood which he was to give to his disciples to eat and drink. This so offended the multitude, that several of them quitted him thereupon. He therefore asked his apostles if they also would leave him; to which Peter replied, To whom shall we go, Lord; for thou hast the words of eternal life (John vi. 53, 54, &c.) One day, as our Saviour was near Cæsarea Philippi, he asked his apostles whom the world took him for? they answered, that some said he was John the Baptist; others, Elias; and others Jeremiah, or one of the prophets. But whom do you say I am? says Jesus Christ. Simon Peter answered, Thou art Christ, the son of the living God. Jesus then said unto Peter, Blessed art thou, Simon Barjona; for flesh and blood hath not revealed it unto thee, but my father which is in heaven (Mat. xvi. 13, 14, &c.) And I say unto thee, that, as thou art Peter, so upon this rock will I build my church, and the gates of hell shall not prevail against it; and I will give unto thee the keys of the kingdom of heaven, and whatsoever thou shalt bind on earth shall be bound in heaven, and whatsoever thou shalt loose upon earth shall be loosed in heaven. About six or eight days after this, our Saviour taking Peter, James, and John,

Peter. up a high mountain, apart from the other disciples, showed them a glimpse of his glory, and was transfigured before them (Mat. xvii. 1, 2, &c. and Luke ix. 28.) Whereupon Peter, seeing Moses and Elias together with Jesus, cried out to them in an ecstasy, Lord, it is good for us to be here! if you please, we will make three tents; one for you, one for Moses, and one for Elias.

Jesus returning from thence to Capernaum, those that gathered the tribute-money came to Peter, and said, Does not your master pay tribute? Whereupon Jesus ordered Peter to throw his line into the sea, and that he should find wherewith to pay the toll for them two in the mouth of the first fish he should take. Peter obeyed; and finding a piece of money in the mouth of the fish, he gave it to the tribute-gatherers, as he was directed. One day, as Jesus was discoursing concerning the forgiveness of injuries (Mat. xviii. 21, 22.), St Peter asked him, how often they must forgive, and whether it was sufficient to pardon an offender seven times? Jesus told him, I say, you must pardon not only as far as seven times, but even seventy times seven. Upon another occasion (Mat. xix. 27—29.), as our Saviour was speaking of the danger of riches, Peter said to him, Lord, we have left all things to follow thee; what reward shall we have for it? Jesus answered him, I tell you in truth, that you who have left all things to follow me shall receive an hundred fold even in this world, and in the other eternal life; and at the last day, when the Son of man shall come to judge the world, you shall sit upon twelve thrones to judge the twelve tribes of Israel.

On the Tuesday before our Saviour's passion, Peter showed him the fig-tree he had cursed the evening before, which was now dried up and withered (Mark xi. 12—21.); and the day following, as they sat upon the mountain of Olives, he, with the other apostles, asked Jesus when the temple was to be destroyed (Mat. xxiv. 1, 2, &c. Mark xiii. 1, 2, &c. Luke xxii.) On Thursday he was sent with St John to prepare all things for the passover; and at evening, when Jesus was come into the city with his apostles, and, being set down at table, began to speak of him that should betray him, Peter made signs to John to ask him who this should be (John xiii. 24.) After supper, the disciples entered into a dispute which should be the greatest among them: whereupon Jesus Christ, laying aside his garments, betook himself to wash their feet, to give them an example of humility in his own person. St Peter at first made some difficulty, and would not suffer his master to wash his feet: but Jesus telling him, that if he did not wash his feet, he could have no part in him; St Peter replied, Lord, wash not only my feet, but my hands and head also (John xiii. 6—10.)

Some time after, Jesus said to him (Luke xxii. 31, 32, &c.), Peter, Satan has desired to sift you as men sift wheat; but I have prayed for you, that your faith may not fail: and when you are converted, confirm your brethren. By this he warned St Peter of his fall, that was just at hand, and of his renouncing him; from which, by the assistance of God, he was afterwards to recover. St Peter then asked him, where he was going? and said, he was ready to follow him everywhere,

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not only to prison, but to death itself. But Christ declared to him, that he would be so far from following him to death that he would abjure him three times that very night before the cock should crow, or before break of day. When supper was ended, he went to the garden of Olives, where, taking Peter, James, and John, he went with them apart, that they might be witnesses of his agony. Peter, though before he had showed so much resolution, yet fell asleep with the rest; which occasioned Jesus to say to him, Do you sleep, Simon? Could you not watch with me one hour? (Mark xiv. 37. Mat. xxvi. 40, &c.)

Judas being come with the soldiers to seize Jesus, Peter drew his sword, and cut off the right ear of one called Malchus, who was servant to the high-priest: but Jesus bid him put up his sword into the scabbard; and told him, that all those that fought with the sword should perish by the sword: and at the same time healed Malchus's ear (John xviii. 10, &c.) Peter followed Jesus afar off, as far as the house of Caiaphas, and was let in by means of another disciple, who was known in the family. The soldiers and servants that had brought Jesus, having lighted a fire in the middle of the hall, Peter mingled among them to warm himself also; when a maid-servant, having looked earnestly upon him, said, Surely this man was with Jesus of Nazareth. But Peter made answer, I know not what you say, for I do not so much as know the man. Presently after he went out into the porch, when immediately the cock crew. A little while after another maid said to those that were present, This man was with Jesus of Nazareth. But Peter denied it with an oath. About an hour after, one of the company affirmed that Peter was a disciple of Jesus. Others insisted upon the same thing; and said, that surely he was one of them, for his very speech betrayed him to be a Galilean. Lastly, one of them, being a kinsman of Malchus whose ear Peter had cut off, affirmed the same thing; and asked him, Did not I see you with him in the garden? Peter again denied it with an oath, protesting that he did not know the man. And at the same time the cock crowed the second time. Then Jesus, being in the same hall, and not far from Peter, looked upon him; and Peter then remembering what Jesus had said to him, that before cock-crow he should deny him thrice, he went out of Caiaphas's house, and wept bitterly (Mat. xxvi. 73, 75. Mark xiv. 34, 72.)

Very probably he remained in secret, and in tears, all the time of our Saviour's passion, that is, all Friday and Saturday following; but on Sunday morning, Jesus being risen, and Mary having been at the tomb, and not finding the body of Jesus, she came in haste into the city, to tell Peter and John that they had taken away their master, and that she could not find where they had put him. Peter and John made haste thither, and John coming first, did not go into the sepulchre. Peter then coming up to him, presently stooped down, and saw the linen clothes wherein the body had been wrapt. He went then into the sepulchre, and John with him; after which they returned to Jerusalem, not knowing what had come to pass. But soon after Jesus appeared to the holy women, who had come first to the sepulchre, and bid them give his apostles notice of his resurrection. And the same day

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our Saviour also appeared to Peter, to comfort him, and assure him that his repentance had been acceptable to him.

Some days after, St Peter being returned into Galilee as Jesus had commanded him, and going to fish in the sea of Galilee, or in the lake of Gennesareth, with some other of the apostles, Jesus appeared to them on the shore, and bid them throw out their nets on the right side of the vessel. They threw them out, and took such a multitude of fishes that they could not draw up their nets again. Then St John said to Peter, It is the Lord. Peter immediately girded up himself, for he was naked, and swimming to shore he came to Jesus: then drawing their nets to shore, Jesus dined with them. After dinner, Jesus said to Peter, Simon, son of Jona, do you love me more than these? He answered, Yea, Lord, you know that I love you. Jesus says to him, Then feed my lambs. He put the same question to him again; and Peter making the same answer, our Lord said to him again, Feed my sheep. This he repeated a third time; at which St Peter was troubled, and said, You know, Lord, that I love you. Jesus replied to him, "Feed my sheep. I tell you for a truth, that when you were young, you girded yourself and went where you pleased; but now you are old, another shall gird you, and lead you where you would not go." This he said to let him know what death he was to die. At the same time, Peter seeing St John the Evangelist, said to our Saviour, Lord, what must become of him? Jesus answered, "If I will that he tarry till I come, what does that concern you? Do you follow me." Thus he refused to declare in what manner St John should end his life.

After that Jesus Christ had ascended into heaven, and that the apostles had been witnesses of his ascension, they returned to Jerusalem, to wait there for the Holy Ghost, whom our Saviour had promised to send them; and being assembled together in a house, they continued there in prayer, and in the union of charity, till the time that the Holy Ghost descended upon them, in the form of tongues of fire. During this interval, St Peter proposed to the apostles, and to the rest of the assembly, to fill up the place that the traitor Judas had left vacant in the apostleship. The proposal was agreed to by all; and two persons were proposed, Joseph Barsabas and Matthias: upon this last the lot fell; and from that time he was admitted one of the apostles. The tenth day after the ascension of our Saviour, being the day of Pentecost, the Holy Ghost having descended upon the apostles, and upon all the faithful that were assembled with them, and having replenished them with supernatural gifts, and especially with the gift of tongues, all those who were witnesses of this miracle expressed their admiration at it; and there being upon that day at Jerusalem a great many Jews from several provinces of the east, they could not comprehend by what means these men, who were Galileans, should speak the languages of all these pagan nations (Acts ii. 1, 2, &c.) Some of them said, that the apostles were full of new wine. But St Peter standing up, told them, that what they heard and saw was not the effect of drunkenness, but was the completion of the promise that the Holy Ghost had made by the prophet Joel (ii. 28.), to send his spirit upon all flesh, and to give the spirit of prophecy to young and

old, to men and women. He afterwards spoke to them of Jesus Christ, and told them that he was the true Messiah, that he was risen from the dead as the scripture had foretold he should; declaring that himself and the other apostles were witnesses of his resurrection; of his ascension into heaven, and of the mission of the Holy Ghost, the visible effects of which they saw with their own eyes in the gifts of languages wherewith they had been replenished.

Then those that heard him were touched with compunction, and asked the apostles, Brethren, what shall we do? Peter answered them, Repent, and be baptized, and you shall receive the Holy Ghost. Then he instructed them, baptized them, and that very day three thousand persons were added to the church (Acts iii. 1, 2, &c.) Some days after, St Peter and John, going to the temple at the hour of prayers, met at a gate of the temple a man who had been lame from his birth, so that he was carried about. This man seeing Peter and John, asked alms of them: upon which Peter said to him, Silver or gold I have not; but such as I have I give thee: In the name of Jesus of Nazareth, rise up and walk. Presently the man got up, and went into the temple along with them, lifting up his voice, and glorifying God. He held St Peter, telling the people then assembled all that happened unto him. Then Peter, taking this occasion, told the people, that it was not by his own power that he had performed the miracle they so much wondered at, but that it was by the power of Jesus Christ that this man was healed. He then laid before them the great crime they had committed, in putting Jesus Christ to death, who was the Saviour of the world, and the Messiah; and after he had shewn them by all the prophecies that Christ was to die thus, he exhorted them to repentance, and to make a proper use of the death of Christ.

He was thus speaking to the people, when the priests and Sadducees coming upon them, laid hold on Peter and John, and put them in prison, until the day following, it being now late (Acts iv. 1, 2, &c.) But the number of those that were converted this day at the second preaching of St Peter was about five thousand. The day following, the rulers, magistrates, and chief priests being assembled on this occasion, ordered the apostles to be brought before them; and then asked them, by whose authority they performed the miracle of healing the lame man? St Peter answered, that it was in the name of Jesus of Nazareth, whom they had crucified, and whom God raised again from the dead. The assembly were surprised at the boldness of the apostles upon this occasion: but came to a resolution to dismiss them, charging them at the same time to teach no more in the name of Jesus; and threatening them if they should persist in disobedience to these orders. The two apostles returned to their brethren, and related to them all that had passed; which having heard, the brethren raised their voices to heaven, begging God to give them strength and courage to declare his word with perfect liberty; and having finished their prayers, the place shook wherein they were assembled, and they were again filled with the Holy Ghost.

At this time many of the faithful sold their estates, and brought the money to the apostles (*id.* v. 1, 2, &c.) Of this number was a man called Ananias, with his

Peter.

Peter. his wife Sapphira, who, by a private agreement between themselves, concealed a part of the money for which they had sold their land, and brought the rest to St Peter, as if it were the whole sum. Ananias came first; and St Peter said to him, Ananias, how came Satan to seduce you, and to prevail with you to lie to the Holy Ghost, by concealing part of the price of your land? It is not men that you thought to impose on, but God. Immediately Ananias fell down dead, and they carried him out and buried him. About three hours after his wife Sapphira came in, and St Peter said to her almost the same things he had before said to her husband, and immediately she fell down also, and gave up the ghost. This affair infused a great awe in the whole church, and amongst all those that heard of it. (See Acts v.)

The number of believers considerably increased every day; so that they even brought out the sick into the streets, and laid them where Peter was to pass, that at least his shadow might cover some of them, by which means they were healed of their distempers. Then the high-priest and his associates, that is, the Pharisees, caused the apostles to be apprehended and put into prison. But an angel brought them forth, and bid them go into the temple, and there boldly declare all the words of life which God had taught them. This they performed: upon which the princes and priests caused them to be brought before them; and having demanded why they had disobeyed their orders, in continuing to speak still in the name of Jesus Christ, Peter and the apostles answered, that it was more necessary to obey God than man. This answer provoked them very much, and they were going to condemn them to death, when Gamaliel prevailed with them to change their resolution, by representing to them, that if this matter proceeded from God, it was in vain for them to oppose it; but if otherwise, then it should soon vanish of itself. So they dismissed the apostles, after giving them thirty-nine stripes a-piece, and charged them to speak no more in the name of Jesus Christ.

After the martyrdom of St Stephen, a persecution was carried on against the faithful at Jerusalem, and they were obliged to take shelter in several places. The apostles alone continued at Jerusalem (Acts viii. 1, 2, 3, &c.) St Philip the deacon going to Samaria, the Samaritans received the word of the Lord, and several of them were baptized. Then St Peter and St John repaired thither also, to give them the Holy Ghost; which St Philip, being only a deacon, had not power to do. Simon the magician was also baptized among others; and admiring the power that the apostles had, of conferring the Holy Ghost, would have bought the same power of the apostles, and accordingly offered money to St Peter. But Peter with indignation replied to him, Thy money and thou perish together, who thinkest the gifts of God can be bought with money! Thou hast no part with us, nor hast any pretensions to this ministry, for thy heart is not right before God. Repent therefore of this wickedness, and pray to God if perhaps he will pardon the wicked thoughts of thy heart. After this Peter and John returned again to Jerusalem. See Acts viii.

The fire of persecution being now pretty well extinguished, St Peter departed from Jerusalem (Acts ix. 32, &c.), and visiting the disciples from city to ci-

ty, he came also to see the saints that dwelt at Lydda. Here he found a man called Æneas, who had been paralytic for eight years. St Peter said to him, Æneas, rise up; Jesus Christ the Lord cures you. He presently got up; and all that dwelt at Lydda that saw the miracle were converted to the Lord. There was also at Joppa a certain holy woman, named Tabitha, who happening to die while St Peter was at Lydda, the disciples sent to desire him to come to them. Whereupon St Peter came, and entering into the chamber where Tabitha lay dead, he caused every body to go out, and betook himself to prayers. Then turning himself towards the corpse, he said, Tabitha, arise. At which instant she opened her eyes, and seeing St Peter, she sat up. This miracle was much famed at Joppa, and was the occasion that many were converted. St Peter stayed there a good while, taking up his lodging with one Simon a tanner.

Now there was at Cæsarea of Palestine a centurion called Cornelius, a man that feared God (Acts x. 1, 2, 3.), and to whom it was revealed by an angel, that he should send to Joppa to Peter, who should tell him what he had to do. Cornelius immediately sent two of his servants; and while they were upon the road, the Lord sent a vision to Peter, to prepare him to go to this man without any scruple, although he was not a Jew; for as yet the door of the gospel had not been opened to the Gentiles. St Peter, then being at the top of the house, fell into a trance, and saw, as it were, a great sheet of linen let down from heaven, which was full of all kinds of animals and reptiles, both clean and unclean. He had this vision three times, and heard a voice, saying, Arise Peter, kill and eat. But Peter answered, Lord, I have never eaten any thing unclean. The voice replied, Call not that unclean which God has purified. After which the sheet was again taken up into heaven. At the same time, the men came in that had been sent by Cornelius. They acquainted him with what had happened to their master, and desired him to go along with them to Cæsarea. The day following St Peter set out thither, and was accompanied by some of the brethren of Joppa. (See Acts x.)

When Peter was returned to Jerusalem, the faithful of the circumcision said to him, why have you gone unto the uncircumcised, and why did you eat with them? but Peter having related to them all that passed, they were satisfied, and glorified God who had given the gift of repentance leading to life as well to the Gentiles as to the Jews. It is thought, that a little after this Peter went to Antioch, where he founded the Christian church of which he was bishop (Gal. ii. 11.) It is believed that he continued here seven years, though not constantly: for during this time, he went to Jerusalem, and to the provinces of Asia Minor, to Bithynia, Cappadocia, and Pontus, as is concluded from the epistle that he afterwards addressed to the faithful of these provinces. From thence he went to Rome, in the 42d year of the Christian era; and it is thought that at his leaving Antioch he there fixed St Ignatius in his place. Eusebius thinks, that the chief occasion of his going to Rome was to oppose Simon Magus, who by his deceits had perverted a great number of persons. However, the presence of St Peter, and the true miracles that he opposed to the tricks

Peter.

of Simon, ruined, or much diminished, the reputation of this impostor.

St Peter, leaving Rome, came to Jerusalem at the passover, in the 44th year of the Christian era, when Herod Agrippa began to persecute the church. That prince put St James the Greater, brother of John, to the sword (Acts xii. 1, &c.); and perceiving that his death was agreeable to the Jews, he moreover caused Peter to be apprehended and put in prison, with a design of executing him publicly after the passover. But the very night that Herod thought of putting him to death, as Peter, loaded with chains, was asleep between two soldiers, the angel of the Lord awakened him, broke off his chains, opened the prison door, and brought him out the length of a street. Then the angel leaving him, he came to the house of Mary the mother of John, where many of the faithful were assembled at prayers; and having knocked at the door, a damsel named Rhoda came to open it; but when she heard Peter's voice, instead of opening the door, she ran in a transport of joy to acquaint the family that Peter was at the door. Those that heard her could not believe it, and said, it was his angel, and not himself: but continuing to knock, and being let in, he informed them of what had happened to him.

He then left Jerusalem; but we are not told what became of him till the time of the council held at Jerusalem in the year 51. It is thought that before this time he made his second journey to Rome, from whence he wrote his first epistle.

St Peter was obliged to leave Rome in the year 51 by order of the emperor Claudius, who had banished all Jews from thence, because of the tumults they continually raised there, excited by one Chrestus, as Suetonius says, meaning probably by this name Jesus Christ. The apostle then returned into Judea, where was held the council of Jerusalem; in which, after a strict examination of the matter proposed to Peter and the apostles, he spoke to them with much wisdom, saying (Acts xv. 7, 8, &c.), that God having given his Holy Ghost and the gift of faith to the Gentiles as well as to the Jews, they ought not to impose the yoke of the legal observances on the new converts, which (as he says) neither we nor our fathers have been able to bear. But we believe, that it is through the grace of Jesus Christ that both we and they shall be saved. St James the Less, bishop of Jerusalem, seconded this opinion of St Peter; and the council came to this conclusion, That no new obligation should be imposed on the Gentiles, but only that they should be required to abstain from fornication, from the use of blood, and from meats offered to idols. The resolution of this council was written to the faithful of Antioch, because it was there this question was first started.

Some time after, St Peter coming to Antioch (Gal. ii. 11, &c.), he eat and drank with the Gentiles, without regarding that distinction of meats enjoined by the law. But after that, when some of the faithful of Jerusalem came to Antioch, being converted Jews, St Peter, out of fear to offend them, separated himself from the converted Gentiles, and would no longer eat with them as before. St Paul, fearing that what St Peter did might be interpreted as if he had a desire to oblige the Gentiles to judaize, and to submit themselves to the yoke of the law, and so to revoke and annul

what he himself had determined in the council of Jerusalem, he withstood Peter to his face, and openly expostulated with him, telling him, he was much in the wrong to endeavour to oblige the Gentiles, at least tacitly by his own manner of acting, to live as the Jews do; and St Peter received this reprehension with silence and humility.

The particulars of St Peter's life are little known from the 51st year of the vulgar era, in which the council of Jerusalem was held, till his last journey to Rome, which was some time before his death. Then being acquainted by revelation that the time of his death was not far off (2 Pet. i. 14.), he had a mind to write to the faithful that had been converted by him, to put them in mind of the truths he had before taught them. He sent them therefore his second epistle.

St Peter and St Paul came to Rome about the same time, in the year of Christ 65, where they performed many miracles, and made many converts. Simon Magus by his tricks continued here to deceive the people, pretending himself to be the Messiah, and even attempting to ascend into heaven: for having caused himself to be carried up into the air by his dæmons, in a fiery chariot, St Peter and St Paul betook themselves to their prayers; and then the impostor, being forsaken by his dæmons, fell down upon the ground, which fall some time afterwards occasioned his death. See SIMON MAGUS.

Soon after this, St Peter was taken up and thrown into prison, where it is said he continued for nine months; at last he was crucified at Rome in the Via Ostia; with his head downwards, as he himself had desired of his executioners. This he did out of a sense of humility, for fear it should be thought, as St Ambrose says, that he affected the glory of Jesus Christ, and the more to augment the pain of his execution.

It is said, that the body of St Peter was at first buried in the catacombs, two miles from Rome, from whence it was afterwards transported to the Vatican, where it has lain ever since. His festival is celebrated with that of St Paul on the 29th of June. St Peter died in the 66th year of the vulgar era, after having been bishop of Rome for about 24 or 25 years. His age might be about 74 or 75 years. It is generally agreed, that St Linus was his successor. The following is the portraiture that Nicephorus gives us of St Peter, which he has probably taken from the ancient pictures that were preserved of this apostle. He was not fat, but pretty tall and upright, having a fair and palish countenance. The hair of his head and beard was thick, frizzled, and not long. His eyes were black, and blood-shot; his eye-brows protuberant and lofty; his nose something long, and rather flat than sharp.

The two epistles of St Peter are addressed to those Jewish converts who were scattered throughout Pontus, Galatia, &c. not only upon the persecution raised at Jerusalem, but upon former dispersions of the Jews into those places on several other occasions. The first epistle is principally designed to comfort and confirm them under those fiery trials and manifold temptations they were then subject to, and to direct and instruct them how to behave in the several states and relations both of the civil and the Christian life, that they

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Peter. they might not be engaged in those rebellions against Cæsar and his officers, then fomented among the Jews; and that they might stop the mouths of those who spoke against them as evil doers. In the second epistle, he prosecutes the same subject, to prevent their apostacy from the faith, on account of any persecutions they were liable to. He likewise guards them against the corrupt principles of the gnostics, and those who scoffed at the promise of Christ's coming, as if it would never be verified.

*Blackwall's
Sacred Clas-
sics defended.*

St Peter's style, says a modern author, expresses the noble vehemence and fervour of his spirit, the full knowledge he had of Christianity, and the strong assurance he had of the truth and certainty of his doctrine; and he writes with the authority of the first man in the college of the apostles. He writes with that quickness and rapidity of style, with that noble neglect of some of the formal consequences and niceties of grammar, still preserving its true reason, and natural analogy (which are always marks of a sublime genius), that you can scarce perceive the pauses of his discourse and distinction of his periods. The great Joseph Scaliger calls St Peter's first epistle majestic; and we hope he was more judicious than to exclude the second, though he did not name it.

A noble majesty, and becoming freedom, is what distinguishes St Peter; a devout and judicious person cannot read him without solemn attention and awful concern. The conflagration of this lower world, and future judgment of angels and men, in the third chapter of the second, is described in such strong and terrible terms, such awful circumstances, that in the description we see the planetary heavens and this our earth wrapped up with devouring flames, hear the groans of an expiring world, and the crushes of nature tumbling into universal ruin.

The authority of the second epistle of St Peter was for some time doubted of, as Origen, Eusebius, St Jerome, and others have observed. What made the ancients call it in question, is the difference of its style from the first. The third chapter, which describes the catastrophe of the visible world, made Grotius think this epistle was wrote after the taking of Jerusalem; because that was not to happen till after the destruction of that city; upon which he conjectures, that Simeon bishop of Jerusalem is the author of this epistle, and that the inscription which carries St Peter's name is corrupted. But the best critics admit this epistle to be the genuine work of St Peter, who discovers himself, where he says, that he was present at our Lord's transfiguration; and where he tells the Jews, this was the second letter he had written to them. The reader may see this question fully discussed, and the authority of this epistle established beyond all doubt, by the learned Dr Sherlock, in his *Dissertation* on the authority of the Second Epistle of St Peter.

St Peter has been made the author of several books; such were, his Acts, his Gospel, his Revelation, his work about preaching, and another about judgment. There is extant a large history of St Peter, called the *Recognitions*, ascribed to St Clement.

PETER of Blois, a learned man of the 12th century, was born about the year 1120, at the city of Blois in France, from whence he derived his name. His pa-

rents being opulent, gave him a learned education. In his youth, when he studied in the university of Paris, he was excessively fond of poetry; and when he was a little further advanced in life, he became no less fond of rhetoric, to the study of which he applied with the greatest ardour. From Paris he removed to Bononia in Italy, to acquire the civil and canon law; in the knowledge of both which he very much excelled. He appears from his writings to have cultivated medicine, and several branches of the mathematics, with no little care and success. The study of theology was the chief delight and business of his life, in which he spent the greatest part of his time, and made the greatest progress. But unfortunately it was that scholastic theology, which consisted in vain attempts to prove and explain the many absurd opinions which then prevailed in the church, by the subtleties of Aristotelian logic. In attempting to explain in this manner the most absurd of all opinions that ever existed amongst mankind, he was the very first person who employed the famous word *transubstantiation*, which was soon after adopted by the church of Rome, and hath ever since made so great a noise. Being appointed preceptor to William II. king of Sicily in 1167, he obtained the custody of the privy seal; and, next to the archbishop of Palermo, the prime minister, had the greatest influence in all affairs. But his power was not of long duration; for the archbishop being banished in 1168, our author soon after left the court of Sicily, and returned into France. He was not long, however, without a royal patron, being invited into England by Henry II. who employed him as his private secretary, made him archdeacon of Bath, and gave him some other benefices. When he had spent a few years at court, he conceived a disgust at that way of life (of which he hath drawn a very unpleasing picture in one of his letters), and retired into the family of Richard archbishop of Canterbury, who had made him his chancellor about the year 1176. In this station he continued to the death of the archbishop in 1183, enjoying the highest degree of favour with that prelate, though he used much freedom in reproving him for his remissness in the government of the church. Our author remained in the same station in the family of archbishop Baldwin, who succeeded Richard, acting both as his secretary and chancellor. He was also sent by that prelate on an embassy to Rome in 1187, to plead his cause before Pope Urban III. in the famous controversy between him and the monks of Canterbury about the church of Hackington. After the departure of his friend and patron Baldwin for the Holy Land in 1190, our author was involved in various troubles in his old age, the causes of which are not distinctly known; and died about the end of the 12th century. He appears from his works, which may be justly reckoned among the most valuable monuments of the age in which he flourished, to have been a man of great integrity and sincere piety, as well as of a lively inventive genius and uncommon erudition. His printed works consist of 134 letters, which he collected together at the desire of Henry II.; of 65 sermons, delivered on various occasions; and of 17 tracts on different subjects.

PETER the Hermit. See **CROISADE** and **HERMIT**.

PETER I. justly styled *Peter the Great*, czar, and afterwards

Peter.

Peter.

afterwards emperor, of Russia, founder of the Russian empire; for though the country was well known, and of great antiquity, yet it had no extent of power, of political influence, or of general commerce, in Europe, till his time. He was born in 1672; and was proclaimed czar when but ten years of age, in exclusion of John his elder brother, who, being of a sickly constitution, was at the same time very weak in his understanding. The princess Sophia, his half sister, made an insurrection in favour of John; and to put an end to the civil war, it was at last agreed that the two brothers should jointly share the imperial dignity. Peter had been very ill brought up, not only through the general defects of the Russian education, but likewise through the arts of the princess Sophia, who surrounded him with every thing that might stifle his natural desire of knowledge, deprave his mind, and enervate it with pleasures. Notwithstanding this, his inclination for military exercises discovered itself in his tenderest years. He formed a company of 50 men, commanded by foreign officers, clothed and exercised after the German manner. He entered himself into the lowest post, that of a drummer; and never rose otherwise than as a soldier of fortune. Herein his design was to teach his nobility, that merit, not birth, was the only title to military employments. He reinforced his company with several others, till at last he had got together a considerable body of soldiers. As he then had no war on his hands, he exercised them in all sorts of mock-engagements, and by this means secured to himself a body of well-disciplined troops. The sight of a Dutch vessel, which he had met with on a lake belonging to one of his pleasure-houses, made such an impression on his mind, that he conceived the almost impracticable design of forming a navy. His first care was to get some Hollanders to build some small vessels at Moscow; and he passed two successive summers on board English or Dutch ships, which set out from Archangel, that he might instruct himself in every branch of naval affairs (A). In 1696 czar John died, and Peter was now sole master of the empire. In 1698 he sent an embassy to Holland; and went *incognito* in the retinue, and visited England as well as Holland, in order to inform himself fully in the art of ship-building. At Amsterdam he worked in the yard as a private ship-carpenter, under the name of *Peter*

Michaelof; but he has been often heard to say, that if he had never gone to England, he had still remained ignorant of that art. In 1700 he had got together a body of standing forces, consisting of 30,000 foot; and now the vast project he had formed displayed itself in all its parts. He opened his dominions, which till then had been shut up, having first sent the chief nobility of his empire into foreign countries to improve themselves in knowledge and learning. He invited into Russia all the foreigners he could meet with, who were capable of instructing his subjects in any manner, and offered them great encouragement to settle in his dominions. This raised many discontents; and the despotic authority he exerted on that occasion was scarcely powerful enough to suppress them. In 1700, being strengthened by the alliance of Augustus king of Poland, he made war on Charles XII. king of Sweden. His first ill success did not deter him; for he used to say, I know that my armies must be overcome for a great while; but even this will at last teach them to conquer. He afterwards gained considerable advantages; and founded Petersburg in 1703. In 1709 he gained a complete victory over the Swedes at Pultowa. In 1712 he was inclosed by the Turks on the banks of the Pruth; and seemed inevitably lost, had not the czarina Catherine bribed the grand vizir, and the czar's prudence completed his deliverance. In 1716 he made a tour through Germany and Holland, and visited the royal academy of sciences at Paris. It would be endless to enumerate all the various establishments for which the Russians are obliged to him. He formed an army according to the manner of the politest and most experienced nations: he fitted out fleets in all the four seas which border upon Russia: he caused many strong fortresses to be raised after the best plans; and made convenient harbours: he introduced arts and sciences into his dominions, and freed religion from many superstitious abuses: he made laws, built cities, cut canals, &c.; was generous in rewarding, impartial in punishing; faithful, laborious, and humble; yet was not free from a certain roughness of temper natural to his nation. He had indeed cured himself of excess in drinking; but he has been branded with several other vices, particularly cruelty. He published the unfortunate history of his son prince Alexis (B); towards whom some blame his severity, while others think

Peter.

(A) The following circumstance, it is said, in some measure determined Peter to attempt those reformatations which he afterwards accomplished. Great events have been sometimes the effect of little causes; and it is at least possible, that without the occurrence we are going to relate, Russia might still have been in a state of barbarism. A young Genevese, called *Le Fort*, about 1695, went to Moscow with the Danish ambassador. The czar Peter, who was then 19 years old, fell in company with this Genevese, who had soon learnt the Russian tongue, and spoke almost all the tongues of Europe. *Le Fort* ingratiated himself with the prince, entered into his service, and soon afterwards into his familiarity. He made him comprehend that there was a different manner of living and reigning from what had unhappily obtained throughout his vast and miserable empire. A prince must be born with an uncommon greatness of soul to listen readily to a stranger, and to be able to divest himself of the prejudices of a throne and of his country. The czar was sensible that neither himself nor his people were yet to be reckoned among men; and that he had an empire to form, but could have no assistance at home. From that time he took a resolution to leave his dominions; and set out, like another Prometheus, to borrow celestial fire for animating his countrymen.

(B) Alexis, like his father, is said to have married a slave, and, like him, quitted Moscovy secretly, but had not the same success in his undertakings; and the being but a bad imitator of his father, cost him his life. He became an example of the most terrible severity that ever was given from the tribunal of the throne: but, what

Peter. think it no more than was necessary. He perfectly knew the honour due to persons of merit; and not only heaped honours upon them during their life, but gave them marks of esteem even after their death. He died of the strangury in 1725, and left the world with the magnanimity of a hero and the piety of a Christian.

Peter was tall of stature, and of a bold and majestic aspect, though sometimes disfigured by convulsions, which altered his features. This deformity was ascribed to poison, given him, as it is said, by his sister Sophia; but it was indeed no other than wine and brandy, which he often drank to excess, relying too much on the strength of his constitution. He conversed with persons in all stations, from the mechanic to the general of an army; and his conversation was neither like that of a barbarian who makes no distinction between men, nor of a popular prince who seeks to please all the world, but that of a person who aims at instruction. He loved women as much as the king of Sweden, his rival, dreaded them, and

all were equally agreeable to him as well in bed as at board; he valued himself on drinking large draughts, rather than sipping delicious wines. We are told that kings and legislators should never suffer themselves to be transported by passion; but never was any man more passionate than Peter the Great, nor more mercilefs. In a king this is more than an infirmity for which we make amends by confessing it; but it was generally remarked of Peter, and he himself said to a magistrate of Holland, at his second voyage, "I have reformed my nation, and have not been able to reform myself." It is true, the cruelties with which he is reproached were not novelties at the court of Moscow, any more than at that of Morocco: it was not uncommon to see a czar, with his own royal hand, inflict 100 lashes of a bull's pizzle on the naked shoulders of a prime officer of the crown, or of a lady of the palace, for failing in their duty, by getting drunk; or to try the goodness of his sabre, by striking off the head of a criminal. Peter had himself performed some of those ceremonies of his country;

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is much to the honour of the empress Catherine, she had no hand in the misfortunes of that prince, who was born of another woman, and loved nothing that his father loved. Catherine was not in the least suspected of acting the cruel stepmother. The great crime of the unfortunate Alexis was his being too much a Russian, and his disapproving every thing that was grand and immortal, and projected by his father for the glory of the nation. One day, hearing some Moscovites lamenting the insupportable fatigues they were to undergo in the building of Petersburg, he said, "Take courage, this city will not stand long." When he was called to attend his father in a journey of 600 or 700 leagues, which the czar often made, he feigned sickness. He took violent purges for a distemper which he had not; and such quantities of medicines, with excessive drinking of brandy, impaired his health and his wits. At first he had an inclination to learning, was acquainted with geometry and history, and had learnt the German tongue: but he hated war, and would never learn it; for which he was most reproached by his father. They had married him in 1711 to the princess of Wolfenbüttele, sister of the empress consort to Charles VI. This marriage was unfortunate; the princess was often abandoned for a debauch in brandy, and for Afrosina, a Finland wench, of a large stature, well made, and very agreeable. It is reported that the princess died of chagrin, if it be possible for chagrin to prove mortal; and that afterwards the czarowitz secretly espoused Afrosina in 1713, when the empress Catherine had just brought him a brother, at which he had no reason to be uneasy.

The misunderstandings between the father and the son became every day more serious; till at length the father, about the year 1716, threatened the prince to disinherit him; and the prince told him that he intended to go into a monastery.

The czar, in 1717, renewed his journeys, as well with a view to politics as curiosity. He came at last into France. If the son had entertained an inclination to revolt, if he had actually had a party formed in his favour, now was the time to declare himself; but instead of remaining in Russia, making himself popular, and creating dependents, he took a journey in his turn, having with much difficulty scraped together some thousands of ducats which he had secretly borrowed. He threw himself under the protection of the emperor Charles VI. brother of his deceased wife. They kept him for some time *incognito* at Venice, from whence he passed to Naples, where he resided almost a year, while neither his father nor any person in Russia knew the place of his retreat.

While the son kept himself thus concealed, the father was at Paris, where he was received with all the respect paid him in other places, but with a gallantry nowhere to be found but in France. If he went to visit a manufactory, and one piece of work attracted his sight more than another, he was presented with it the next day. He went to dine at the Duke d'Antin's at Petitbourg, where the first thing he saw was his own picture at full length, in the same habit that he wore. When he was at the royal mint of medals, they struck all kinds before him, and presented him with them; at last they struck one which they let drop on purpose at his feet, and left him to take it up. He there saw himself perfectly engraven with these words, *Peter the Great*. The reverse was a Fame, and round her in letters *Vires acquirit cundo*; an allusion no less just than flattering to a prince who really acquired new merit by travelling.

After he had seen this country, where every thing disposes men to gentleness and indulgence, he returned to his own, and resumed his severity. He had engaged his son to return from Naples to Petersburg, from whence that young prince was conducted to Moscow before the czar his father; who began with depriving him of his succession to the throne, by making him sign a solemn act of renunciation at the end of January 1718, in consideration of which act the father promised the son to spare his life.

It

Peter.

Le Fort, however (see note A), had authority enough over him at times to stay his hand even when lifted up to strike, but he had not Le Fort always near him.

The Czar's first marriage is thus related in the memoirs of Peter Henry Bruce, Esq. "It took place in 1690, when he was only 18. He was married to Ottokessa Lapuchin, a boyar's daughter, by whom he had prince Alexis; some time after he turned her away, and shut her up in a monastery, on suspicion of disloyalty to his bed. It was said, that in one of her jealous fits she charged prince Menzikoff with carrying the czar to drabs of his former acquaintance, who had been his customers for cakes; upbraiding him with his first occupation: and that Menzikoff ever after bore an irreconcilable enmity to both her and her son. After the divorce, one Miss Mons, a very beautiful young lady, born at Moscow, of foreign parents, was much in favour with the czar; but when he was abroad, Mr Keyserling, then residing at Moscow as envoy from the king of Prussia, paid his addresses to, and married her. When the czar returned, he was so much offended at Keyserling, that he ordered him to leave Moscow, which occasioned his immediate recall by the king his master, who sent another in his room. It was believed, if his public character had not protected him, he would have severely felt his majesty's displeasure.

"The czar was some time after smitten with the charms of another beautiful young lady, the daughter of a foreign merchant in this city: he first saw her in her father's house, where he dined one day. He was

so much taken with her appearance, that he offered her any terms she pleased, if she would live with him; which this virtuous young woman modestly refused: but dreading the effects of his authority, she put on a resolution, and left Moscow in the night, without communicating her design even to her parents. Having provided a little money for her support, she travelled on foot several miles into the country, till she arrived at a small village where her nurse lived with her husband and their daughter, the young lady's foster-sister, to whom she discovered her intention of concealing herself in the wood near that village: and to prevent any discovery, she set out the same night, accompanied by the husband and daughter. The husband being a timber-man by trade, and well acquainted with the wood, conducted her to a little dry spot in the middle of a morass, and there he built a hut for her habitation. She had deposited her money with her nurse to procure little necessaries for her support, which were faithfully conveyed to her at night by the nurse or her daughter, by one of whom she was constantly attended in the night-time.

"The next day after her flight, the czar called at her father's to see her, and finding the parents in anxious concern for their daughter, and himself disappointed, fancied it a plan of their own concerting. He became angry, and began to threaten them with the effects of his displeasure if she was not produced: nothing was left to the parents but the most solemn protestations, with tears of real sorrow running down their

It was not altogether improbable that such an act would have been some time or other annulled. The czar, therefore, in order to give it more force, forgetting that he was a father, and only remembering that he was the founder of an empire, which his son might overturn, and involve in its ancient barbarity, ordered a public process to be drawn up against that unfortunate prince, for some concealment, with which he was charged, in the confession that they had exacted of him.

An assembly was held of the bishops, inferior ecclesiastics, and professors; who found in the Old Testament, that those who curse their father or their mother should be put to death; that David indeed had pardoned Absalom, who had rebelled against him, but that Absalom was never pardoned by God. Such was their opinion, without drawing any conclusion; but it was in effect signing a warrant for his death. Alexis had not in fact cursed his father, neither had he ever revolted like Absalom; he had never lain publicly with the king's concubines, but he had left the kingdom without his father's permission, and had written letters to his friends, in which he only signified that he hoped they would one day be mindful of him in Russia. But whatever might be his case, of 124 lay judges, who were appointed to sit on him, there was not one that judged his offences less than capital; and those who could not write, made others sign for them. It is reported in Europe, that the czar had got translated from Spanish into Russian the criminal process against Don Carlos, that unfortunate prince whom his father Philip II. had confined in a prison, where the heir of that great monarchy ended his days. But there was nothing like a process carried on against Don Carlos, nor was it ever known whether that prince died a natural or a violent death. Peter, the most despotic of princes, wanted not an example. Certain it is that the prince died the day after the sentence, and that the czar had at Moscow one of the best apothecary's shops in Europe. It is probable, however, that the prince Alexis, the heir of the most extensive empire in the world, being condemned unanimously by his father's subjects, which were one day to be his own, might die of the sudden shock and change given to the body at the apprehension of so strange and dismal a sentence. The father went to see his son in his last agonies; and it is said he shed tears. *Infelix utcumque ferent ea fata nepotes.* These tears, however, did not prevent the wheels from being covered with the broken limbs of his son's friends. He beheaded his own brother-in-law Count Lapuchin, brother to his wife Ottokessa Lapuchin whom he had divorced, and uncle to prince Alexis. The prince's confessor had also his head cut off. If Moscovy has been civilized, she has, it must be confessed, paid dear for her politeness.

The remainder of the czar's life was nothing but a series of grand projects, labours, and exploits, that seemed to efface the memory of his excessive severities, which were perhaps necessary. He made frequent speeches to his court and to his council. In one he told them that he had sacrificed his son to the welfare of his dominions.

Peter. their cheeks, to convince him of their innocence, and ignorance of what was become of her; assuring him of their fears that some fatal disaster must have befallen her, as nothing belonging to her was missing, except what she had on at the time. The czar, satisfied of their sincerity, ordered great search to be made for her, with the offer of a considerable reward to the person who should discover what was become of her, but to no purpose: the parents and relations, apprehending she was no more, went into mourning for her.

“Above a year after this she was discovered by an accident. A colonel who had come from the army to see his friends, going a-hunting into that wood, and following his game through the morasses, he came to the hut, and looking into it saw a pretty young woman in a mean dress. After inquiring of her who she was, and how she came to live in so solitary a place, he found out at last that she was the lady whose disappearance had made so great a noise: in the utmost confusion, and with the most fervent intreaties, she prayed him on her knees that he would not betray her; to which he replied, that he thought her danger was now past, as the czar was then otherwise engaged, and that she might with safety discover herself, at least to her parents, with whom he would consult how matters should be managed. The lady agreed to this proposal; and he set out immediately, and overjoyed her parents with the happy discovery: the issue of their deliberations was to consult Madame Catherine (as she was then called) in what manner the affair should be opened to the czar. The colonel went also upon this business, and was advised by Madame to come next morning and she would introduce him to his majesty, when he might make the discovery and claim the promised reward. He went according to appointment; and being introduced, told the accident by which he had discovered the lady, and represented the miserable situation in which he found her, and what she must have suffered by being so long shut up in such a dismal place, from the delicacy of her sex. The czar showed a great deal of concern that he should have been the cause of all her sufferings, declaring that he would endeavour to make her amends. Here Madame Catherine suggested, that she thought the best amends his majesty could make, was to give her a handsome fortune and the colonel for a husband, who had the best right, having caught her in pursuit of his game. The czar, agreeing perfectly with Madame Catherine’s sentiments, ordered one of his favourites to go with the colonel, and bring the young lady home; where she arrived to the inexpressible joy of her family and relations, who had all been in mourning for her. The marriage was under the direction and at the expence of the czar, who himself gave the bride to the bridegroom; saying, that he presented him with one of the most virtuous of women; and accompanied his declaration with very valuable presents, besides settling on her and her heirs three thousand rubles a-year. This lady lived highly esteemed by the czar, and every one who knew her. Besides the concurring reports of other people, I had the story from her own mouth.”

On the whole, that Peter I. was a great man, few
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Peter. will deny who know what real greatness is. A minute account of the life of this distinguished emperor would make a large volume; we have been able to give but the mere outlines of it: the anecdotes, however, at the end, show in some degree the nature of the man; at all events they show one important truth, that it is a more difficult thing to reform one’s self than to reform a kingdom; to conquer one’s passions, than to conquer the world. The Russians, however, if there is any good in civilization, owe to him every thing: and they seem to be sensible of it; for a very pompous oration was delivered to his memory by Michael Lomonosoff, before the Academy of Sciences at St Petersburg, on the 26th of April 1755. For a minuter account of his improvements, &c. see *Russia, Petersburg, and Catherine I.*

Peter the Wild Boy. This extraordinary creature occasioned great speculation among the learned; but we do not know that any satisfactory causes have been assigned for the striking difference betwixt him and other human beings.

The following account of him is extracted from the parish-register of North church, in the county of Hertford. “Peter, commonly known by the name of *Peter the Wild Boy*, lies buried in this churchyard, opposite to the porch. In the year 1725 he was found in the woods near Hamelen, a fortified town in the electorate of Hanover, when his Majesty George I. with his attendants, was hunting in the forest of Hertswold. He was supposed to be then about 12 years of age, and had subsisted in those woods upon the bark of trees, leaves, berries, &c. for some considerable length of time. How long he had continued in that wild state is altogether uncertain; but that he had formerly been under the care of some person, was evident from the remains of a shirt-collar about his neck at the time when he was found. As Hamelen was a town where criminals were confined to work upon the fortifications, it was then conjectured at Hanover that Peter might be the issue of one of those criminals, who had either wandered into the woods and could not find his way back again, or being discovered to be an idiot was inhumanly turned out by his parents, and left to perish or shift for himself. In the following year, 1726, he was brought over to England by the order of Queen Caroline then princess of Wales, and put under the care of Dr Arbuthnot with proper masters to attend him. But notwithstanding there appeared to be no natural defect in his organs of speech, after all the pains that had been taken with him he could never be brought distinctly to articulate a single syllable, and proved totally incapable of receiving any instruction. He was afterwards intrusted to the care of Mrs Titchbourn, one of the queen’s bed-chamber women, with a handsome pension annexed to the charge. Mrs Titchbourn usually spending a few weeks every summer at the house of Mr James Fenn, a yeoman farmer at Axter’s End in this parish, Peter was left to the care of the said Mr Fenn, who was allowed 35 l. a-year for his support and maintenance. After the death of James Fenn he was transferred to the care of his brother Thomas Fenn, at another farm-house in this parish called Broadway, where he lived with the several successive tenants of that farm, and with the same provision

Peter. tion allowed by government to the time of his death, Feb. 22. 1785, when he was supposed to be about 72 years of age.

"Peter was well made, and of the middle size. His countenance had not the appearance of an idiot, nor was there any thing particular in his form, except that two of the fingers of his left hand were united by a web up to the middle joint. He had a natural ear for music, and was so delighted with it, that if he heard any musical instrument played upon, he would immediately dance and caper about till he was almost quite exhausted with fatigue: and though he could never be taught the distinct utterance of any word, yet he could easily learn to hum a tune. All those idle tales which have been published to the world about his climbing up trees like a squirrel, running upon all fours like a wild beast, &c. are entirely without foundation; for he was so exceedingly timid and gentle in his nature, that he would suffer himself to be governed by a child. There have been also many false stories propagated of his incontinence; but, from the minutest inquiries among those who constantly lived with him, it does not appear that he ever discovered any natural passion for women, though he was subject to the other passions of human nature, such as anger, joy, &c. Upon the approach of bad weather he always appeared sullen and uneasy. At particular seasons of the year he showed a strange fondness for stealing away into the woods, where he would feed eagerly upon leaves, beech-mast, acorns, and the green bark of trees, which proves evidently that he had subsisted in that manner for a considerable length of time before he was first taken. His keeper therefore at such seasons generally kept a strict eye over him, and sometimes even confined him, because if he ever rambled to any distance from his home he could not find his way back again: and once in particular, having gone beyond his knowledge, he wandered as far as Norfolk, where he was taken up, and being carried before a magistrate, was committed to the house of correction in Norwich, and punished as a sturdy and obstinate vagrant, who would not (for indeed he could not) give any account of himself: but Mr Fenn having advertised him in the public papers, he was released from his confinement, and brought back to his usual place of abode.

"Notwithstanding the extraordinary and savage state in which Peter was first found greatly excited the attention and curiosity of the public; yet, after all that has been said of him, he was certainly nothing more than a common idiot without the appearance of one. But as men of some eminence in the literary world have in their works published strange opinions and ill-founded conjectures about him, which may seem to stamp a credit upon what they have advanced; that posterity may not through their authority be hereafter misled upon the subject, this short and true account of Peter is recorded in the parish-register by one who

constantly resided above 30 years in his neighbourhood, and had daily opportunities of seeing and observing him." Peter.

Perhaps it may not be disagreeable to our readers if we present them with Lord Monboddo's account of this extraordinary creature (A). "It was in the beginning of June 1782 (says his Lordship) that I saw him in a farm-house called Broadway, within about a mile of Berkhamsted, kept there upon a pension which the king pays. He is but low of stature, not exceeding five feet three inches; and although he must now be about 70 years of age, has a fresh healthy look. He wears his beard; his face is not at all ugly or disagreeable; and he has a look that may be called sensible and sagacious for a savage. About 20 years ago he was in use to elope, and to be missing for several days; and once, I was told, he wandered as far as Norfolk; but of late he has been quite tame, and either keeps in the house or saunters about the farm. He has been the 13 last years where he lives at present; and before that he was 12 years with another farmer, whom I saw and conversed with. This farmer told me, that he had been put to school somewhere in Hertfordshire, but had only learned to articulate his own name Peter, and the name of King George, both which I heard him pronounce very distinctly. But the woman of the house where he now is (for the man happened not to be at home) told me, that he understood every thing that was said to him concerning the common affairs of life; and I saw that he readily understood several things that she said to him while I was present. Among other things, she desired him to sing Nancy Dawson; which he did, and another tune which she named. He never was mischievous, but had always that gentleness of nature which I hold to be characteristic of our nature, at least till we became carnivorous, and hunters or warriors. He feeds at present as the farmer and his wife do; but, as I was told by an old woman (one Mrs Collop, living at a village in the neighbourhood called Hempstead, who remembered to have seen him when he first came to Hertfordshire, which she computed to be 55 years before the time I saw her), he then fed very much upon leaves, and particularly upon the leaves of cabbage, which he eat raw. He was then, as she thought, about 15 years of age, walked upright, but could climb trees like a squirrel. At present he not only eats flesh, but has also got the taste of beer, and even of spirits, of which he inclines to drink more than he can get. And the old farmer above-mentioned, with whom he lived 12 years before he came to this last farmer, told me, that he had acquired that taste before he came to him, which is about 25 years ago. He has also become very fond of fire, but has not yet acquired a liking for money; for though he takes it, he does not keep it, but gives it to his landlord or landlady, which I suppose is a lesson that they have taught him.

(A) This eccentric writer, in support of his hypothesis, that man in a state of nature is a mere animal, without clothes, houses, the use of fire, or even speech, adduces the oran-outang, or man in the woods, and this Peter the wild man and others, as examples. He denies the want of the organs of speech as an objection, and insists they only want the artificial use of them.

Peter. him. He retains so much of his natural instinct, that he has a fore-feeling of bad weather, growling and howling, and showing great disorder, before it comes.

"These are the particulars concerning him which I observed myself, or could learn by information from the neighbourhood." From all these facts put together his lordship makes the following observations:

"1st, Whatever doubts there may be concerning the humanity of the oran-outang, it was never made a question but that Peter was a man.

"2dly, That he was, as the Dean [Swift] says, of a father and mother like one of us. This, as I have said, was the case of two savages found in the dismal swamps in Virginia, of the one found in the island of Diego Garcia, and of him that was discovered by M. le Roy in the Pyrenees, and in general of all the savages that have been found in Europe within these last 300 years; for I do not believe, that for these 2000 years past there has been a race of such savages in Europe.

"3dly, I think there can be no reason to doubt of what was written from Hanover, and published in the newspapers, that he was found going upon all four, as well as other solitary savages that have been found in Europe. It is true that others have been found erect; which was the case of the two found in the dismal swamp of Virginia, likewise of the man of the Pyrenees, and of him in the island of Diego Garcia: but these I suppose were not exposed till they had learned to walk upright; whereas Peter appears to have been abandoned by his parents before he had learned that lesson, but walked as we know children do at first.

"4thly, I think it is evident that he is not an idiot, not only from his appearance, as I have described it, and from his actions, but from all the accounts that we have of him, both those printed and those attested by persons yet living; for as to the printed accounts, there is not the least information of that kind in any of them, except in one, viz. Wye's letter, n° 8. wherein is said, that some imputed his not learning to speak to want of understanding; which I should think showed rather want of understanding in those who thought so, when it is considered that at this time he had not been a year out of the woods, and I suppose but a month or two under the care of Dr Arbuthnot, who had taken the charge of his education. The Dean indeed tells us, that he suspected he was a pretender, and no genuine wild man, but not a word of his being an idiot. And as to the persons living, not one with whom I have conversed appeared to have the least suspicion of that kind; though it is natural that men who were not philosophers, and knew nothing of the progress of man from the mere animal to the intellectual creature, nor of the improvement of our understanding by social intercourse and the arts of life, but believed that man when he came to a certain age has from nature all the faculties which we see him exert, and particularly the faculty of speech, should

think him an idiot, and wanting even the capacity of acquiring understanding. I knew an officer of dragoons, a man of very good sense, who was quartered where Peter then lived for some months, and saw him almost every day, and who assured me that he was not an idiot, but showed common understanding, which was all that could be expected from one no better educated than he.

"Lastly, those who have considered what I have said (B) of the difficulty of articulation, will not be surprised that a man who had lived a savage for the first 14 or 15 years of his life, should have made so little progress in that art. I cannot, however, have the least doubt, that if he had been under the care of Mr Braidwood of Edinburgh, he would have learned to speak, though with much more difficulty than a man who had been brought up tame among people who had the use of speech, and who consequently must know the advantage of it. And I can have as little doubt that Mr Braidwood could have taught the oran-outang in Sir Ashton Lever's collection, who learned to articulate a few words, so as to speak plainly enough."

St PETER, Le Port, a market-town of England, in the south-east part of Guernsey, in Hampshire, in the British channel, consisting of only one long and narrow street. The mouth of the harbour is well set with rocks, and is on each side defended by a castle, one called the *old castle*, and the other *castle-cornet*. The governor of the island generally resides here, who has the command of the garrison in this and all the other castles. The harbour has a good road, from whence ships may sail with any wind, and from the road pass under the guns of the castle to the pier, close up to the town. The pier is a noble work, formed of vast stones, joined together with great art and regularity; it is not only a security to the ships, but, being contiguous to the town, is handsomely paved at the top with large smooth flag-stones, guarded with parapets, and, being of a great length and breadth, forms a pleasant walk, affording a free prospect of the sea and the neighbouring islands. Cornet-castle, which commands both the town and the harbour, stands on a rock, separated from the land by an arm of the sea, no less than 600 yards wide, and not fordable but at low water in great spring-tides.

St PETER's Island, in the lake of Bienne in Switzerland, remarkable for being one of the retreats of Rousseau; whence it has also got the name of *Rousseau's Island*. It lies towards the south side of the lake, and produces a great variety of shrubs and trees, particularly large oaks, beech, and Spanish chestnut. The southern shore slopes gradually to the lake, and is covered with herbage; the remaining borders are steep and rocky; their summits in a few places thinly covered with shrubs; in others their perpendicular sides are clothed to the water's edge with hanging woods. The views from the different parts of the island are

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(B) Lord Monboddo, far from thinking speech or articulation natural to man, rather wonders how he can by any teaching or imitation attain to the ready performance of such various and complicated operations. Add to this, when the organs are completely formed to one language, how hard it is to make them answer another.

Peter,
Peter-
borough.

beautiful and diversified; that to the north being the most extensive and pleasing. It commands the prospect of the lake, which is of an oval form; its cultivated borders, interspersed with villages and castles, with the towns of Nidau and Bienne standing upon the farther extremity. Agreeable walks are carried through the woods, and terminate in a circular pavilion placed in the centre of the island. Before the troubles in France, on Sunday, and particularly the vintage-time, this island was filled with parties who amused themselves with wandering about the woods or dancing in the circular pavilion. How they employ themselves now it is not so easy to say, as it was overrun and subjected by the forces of that unhappy nation, and of course tainted with their destructive principles. It was retaken by the Spaniards, and properly belongs to the king of Sardinia. There is only one farm-house on the island, in an apartment of which Rousseau was lodged.

PETER-Pence, was an annual tribute of one penny, paid at Rome out of every family at the feast of St Peter. And this Ina the Saxon king, when he went in pilgrimage to Rome about the year 740, gave to the pope partly as alms and partly in recompence of a house erected in Rome for English pilgrims. And this continued to be paid generally until the time of King Henry VIII. when it was enacted, that from henceforth no person shall pay any pensions, Peter-pence, or other impositions, to the use of the bishop or see of Rome.

PETERBOROUGH, a city of Northamptonshire, about 82 miles from London. It is the least city except perhaps Ely, and unquestionably the poorest bishopric, though one of the oldest towns in England. It had a monastery dedicated to St Peter, and founded as early as the year 655, to which the abbot of Croyland and his monks flying for protection in the year 870, they were overtaken and murdered in a court of this monastery called the *monks churchyard*, because they were all buried here; and to this day is to be seen the tombstone with their effigies, which had been erected over their common grave. Soon after this the Danes destroyed both the monastery and friars, so that it lay desolate for above 100 years. The monks were, however, restored, and lived very sumptuously, with a mitred abbot at their head, till the reformation, when Henry VIII. converted it into a bishop's see. The cathedral, which is said to be more than 1000 years old, though apparently more modern, is a most noble Gothic fabric, and was much more so before it was defaced in the civil wars. The west front, which is 156 feet broad, is very stately; and besides columns curiously adorned, is supported by three of the tallest arches in Britain. The windows of the cloisters are finely stained with scripture-history and the succession of its abbots. There are in the church monuments of Queen Catharine, wife of Henry VIII. and of Mary queen of Scots; and the figure of one Mr Scarlet the sexton, who buried them, and lived to 95, after he had buried all the housekeepers of the town twice over. There is but one parish-church besides the cathedral. The city is governed by a mayor, recorder, and aldermen, by a charter of Henry VIII. All its officers are elected by the dean and chapter, consisting of six prebendaries, who are all lords of the manor. Besides the

dean and chapter, who are an ecclesiastical corporation distinct from the bishop, there are eight petty canons, four students in divinity, one epistler, one gospeller, a subdean, subtreasurer, and chanter, eight choristers, eight singing men, two chancellors, besides a steward, organist, &c. a grammar-school, and two charity-schools. The river Nen, over which there is here a wooden bridge, is navigable by barges to Northampton, 50 miles further, which bring coal, corn, &c. and by which they export in some years 6000 quarters of malt, besides other goods, especially the woollen manufactures either of cloth or stockings, in which the poor are employed. The air of Peterborough is said not to be very wholesome, by reason of the neighbouring fens; but the water of the river is fresh and good, the highest spring-tide never coming up within five miles of the town; and there is plenty of excellent water in their wells. The streets are very poor, and the houses but mean; there is, however, a handsome market-house, over which are kept the assizes and sessions. Its jurisdiction extends over 32 towns and hamlets, wherein the civil magistrates appointed by the royal commission are vested with the same power as judges of assize, and hold their quarterly sessions in this city.

PETERHEAD, a town in Scotland, in the county of Aberdeen, lies about 30 miles north-east of that city. It stands on the most easterly point in Scotland, and from thence due west that kingdom is broadest.

Peterhead is the nearest land to the northern continent of Europe, and lies within 300 miles of the *cape*, which is called the *Naze of Norway*. Through this channel the grand body of the herrings pass in their annual migrations from Shetland and the north seas to the more southern latitudes, attended with the all-devouring cod and ling; on which account Peterhead, or, as it is sometimes called, *Buchanness*, hath always been the second station of the Dutch buffes after leaving the Shetland islands. Tradition says, that some hundred years ago the Dutch offered Lord Mareschal, then the proprietor of the coast, to cover a small island called *Inch-Keith* with silver for the property of it to carry on their fisheries, which for obvious reasons could not be accepted. Be that as it may, the Dutch still frequent the coast in July and August, and sometimes 100 sail are seen within sight of land, busily employed in the herring and white fisheries. The natives, to whom this treasure properly belongs, have lately made some attempts towards the white fishery, of which they cure and vend chiefly at the London market 4000 barrels of delicate small cod and ling annually. They also fit out some vessels for the Hebride fishery off Barrahead for the Barcelona market; and they claim the merit of having taught the islanders how to take and cure the large fish which abound on their coasts. They have often gained the highest premiums allowed by government for curing white fishes.

Few harbours in Great Britain are of more importance to navigation than this of Peterhead, as, in case of violent storms from the easterly points, large vessels embayed betwixt this and the mouth of the Forth have not a port that they can safely take at every time of the tide, that of Aberdeen excepted. If therefore they cannot make their way to sea in the teeth of a strong easterly wind, or double this headland that they may gain the Murray frith, they must inevitably come on

Peterhead.

Peterhead, on shore. This harbour lies on a spacious bay, where vessels of any burden may ride in all other winds, and is therefore the general rendezvous of the shipping which frequent the northern seas, where they cast anchor on clean ground, and ride safely till the storms have abated. But though nature hath done so much for the benefit of navigation, something is left for the exercise of human aid. The harbour can at present contain in perfect safety 40 or 50 sail of vessels drawing 12 feet water, and is capable of being extended so as to admit a greater number of ships drawing 20 feet; by which means not only casual merchantmen but small ships of war with their convoys would find this a most desirable refuge when pursued by superior force. The harbour is defended by a good battery. A considerable trade is carried on from this place directly to the Baltic for deals, iron, hemp, tar, and other articles. There is also a manufacture of sewing thread, which employs many young girls. A mineral well in the summer-months gives great gaiety to the place; its salutary virtues have long, and we believe very justly, been celebrated. The waters of this spring are powerfully diuretic, and are thought to be efficacious in removing complaints in the bowels. There are here many elegant houses for the accommodation of strangers. There is also a ball-room, under which there are two salt-water baths. These baths are much frequented in nervous disorders: their effect in strengthening the constitution is often surprising. Owing to the open peninsulated situation, the air of this place is esteemed peculiarly pure and healthful; even the fogs rising from the sea are thought to be medicinal: the town is therefore much enlivened by the concourse of company who frequent it on these accounts. Upon the whole, the town is neat and well built, the houses are handsome, and the streets tolerably spacious and very clean; and it has every appearance of a thriving, plentiful, and happy place.

PETERHOFF, in Russia, is situated about 20 miles from Petersburg, and is distinguished for its palace and gardens. The palace was begun by Peter I. and finished by Elizabeth. As it is placed upon an eminence, it commands a most superb view of Cronstadt, Petersburg, the intervening gulf, and the opposite coast of Carelia. The palace is most magnificently furnished, and the suite of apartments are truly princely. The presence-chamber is richly ornamented with portraits of the sovereigns of the house of Romanof, who have reigned in Russia since 1613.

"The gardens of Peterhoff (says an intelligent traveller) have been celebrated for their taste and elegance; and from the number of jet d'eaus, fountains, basons, cascades, parterres, &c. they have been compared to those of Versailles: and indeed in one respect they are far superior; for the water-works of the latter only play upon particular occasions, while those of Peterhoff are perennial. These gardens, which at the time of their formation were greatly admired in this country, though not congenial to the taste of the empress, are suffered to remain in their present state; as during summer her majesty principally resides at Tzarskoe-Selo, where the grounds are disposed in a more modern and pleasing manner." A vast number of silver dolphins and gilded statues are scattered through them; but the most remarkable figures are those of two gla-

diators placed in a basin of water. These are represented, not with the sword and buckler, the ancient implements of war, but with a brace of pistols. These they point to each other in a threatening posture, while the water gushes impetuously from the barrels. In that part of the garden which lies between the palace and the gulf, close to the water, is a building which was the favourite retreat of Peter I. It is preserved, together with its furniture, entirely in its original state with a kind of religious veneration. Its plainness shows the frugal simplicity in which that monarch was accustomed to live. In the same celebrated gardens there is a remarkable building called the *mountain for sledges*, and often by travellers the *flying mountain*. "It stands (says Mr Coxe) in the middle of an oblong area, inclosed by an open colonnade, with a flat roof, which is railed for the convenience of holding spectators. The circumference of this colonnade is at least half a mile. In the middle of the area stands the flying mountain, stretching nearly from one end to the other. It is a wooden building, supported upon pillars, representing an uneven surface of ground, or a mountain composed of three principal ascents, gradually diminishing in height, with an intermediate space to resemble valleys: from top to bottom is a floored way, in which three parallel grooves are formed. It is thus used: a small carriage containing one person being placed in the centre groove upon the highest point, goes with great rapidity down one hill; the velocity which it acquires in its descent carries it up a second; and it continues to move in a similar manner until it arrives at the bottom of the area, where it rolls for a considerable way on the level surface, and stops before it attains the boundary: it is then placed in one of the side grooves, and drawn up by means of a cord fixed to a windlass. To a person unacquainted with the mechanism, this entertainment would appear tremendous; but as the grooves always keep the carriage in its right direction, there is not the least danger of being overturned. At the top of the mountain is an handsome apartment for the accommodation of the court and principal nobility; there is also room for many thousand spectators within the colonnade and upon its roof. Near the flying mountain is a spacious amphitheatre, in which tournaments are usually exhibited."

PETERS (Father), a Jesuit, was confessor and counsellor to James II. king of England. This prince dismissed him in 1688, because he was considered as the author of those troubles in which the kingdom was then involved. "He was (says Bishop Burnet) the most violent of the king's advisers, and the person most listened to. Though he had the honour of being nobly descended, he was a man of no extensive erudition, and was eminent only for his bigotry and forwardness." Though Burnet is not always to be believed, yet certain it is, from the testimony of other historians, that Father Peters was by no means a person properly qualified to direct King James in the critical situation in which he then stood.

PETERSBURG (**St.**), a city of the province of Ingria in Russia, and capital of the whole empire. It is situated in N. Lat. 59. 26. 23. and E. Long. 30. 25. from the first meridian of Greenwich. It was founded in the year 1703 by Czar Peter the Great, whose ambi-

Peterhead,
Peterhoff.

Peterhoff
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Petersburg.

Coxe's Tra-
vels, vol. i.
p. 485.

Petersburg. ambition it was to have a fleet on the Baltic; for which reason he determined to found a city which might become the centre of trade throughout all his dominions. The spot he pitched upon was a low, fenny, uncultivated island, formed by the branches of the river Neva, before they fall into the gulph of Finland. In the summer this island was covered with mud; and in winter became a frozen pool, rendered almost inaccessible by dreary forests and deep morasses, the haunts of bears, wolves, and other savage animals. Having taken the fort of Nattenbourg, and the town of Neischanz, in the year 1703, this mighty conqueror assembled in Ingria above 300,000 men, Russians, Tartars, Cossacks, Livonians, and others, even from the most distant parts of his empire, and laid the foundation of the citadel and fortifications, which were finished in four months, almost in despite of nature. He was obliged to open ways through forests, drain bogs, raise dykes, and lay causeways, before he could pretend to found the new city. The workmen were ill provided with necessary tools and implements, such as spades, pick-axes, shovels, planks, and wheel-barrows: they were even obliged to fetch the earth from a great distance in the skirts of their garments, or in little bags made of old mats and rags sewed together. They had neither huts nor houses to shelter them from the severity of the weather: the country, which had been desolated by war, could not accommodate such a multitude with provisions; and the supplies by the lake Ladoga were often retarded by contrary winds. In consequence of these hardships, above 100,000 men are said to have perished: nevertheless the work proceeded with incredible vigour and expedition; while Peter, for the security of his workmen, formed a great camp, in such a manner, that his infantry continued in Finland, and his cavalry were quartered in Ingria. Some Swedish cruizers being descried in the neighbourhood, the Czar posted a body of troops in the isle of Rutzari, by whom the Swedes were repulsed, and the work met with no farther interruption. The buildings of the city kept pace with the fortrefs, which is the centre of the town, surrounded on all sides by the Neva; and in little more than a year, above 30,000 houses were erected. At present there may be about double that number in Petersburg, though many of them are paucity and inconsiderable. In order to people this city, Peter invited hither merchants, artificers, mechanics, and seamen, from all the different countries of Europe: he demolished the town of Nieuſchants, and brought hither not only the materials of the houses, but the inhabitants themselves. A thousand families were drawn from Moscow; he obliged his nobility to quit their palaces and their villas in and about Moscow, and take up their residence at Petersburg, in a much more cold and comfortable climate. Finally, resolving to remove hither the trade of Archangel, he issued an ordonnance, importing, that all such merchandize as had been conveyed to Archangel, in order to be sold to foreigners, should now be sent to Petersburg, where they should pay no more than the usual duties. These endeavours and regulations have rendered this one of the greatest and most flourishing cities in Europe. The Russian boyars and nobility have built magnificent palaces, and are now reconciled to their situation. At first many

houses were built of timber; but these being subject to sudden conflagrations in spite of all the precautions that could be taken, the Czar, in the year 1714, issued an order, that all new houses should be walled with brick and covered with tiles. The fort is an irregular hexagon, with opposite bastions. This, together with all the rest of the fortifications, was in the beginning formed of earth only; but in the sequel they were faced with strong walls, and provided with casemates, which are bomb-proof. In the curtain of the fort, on the right-hand side, is a noble dispensary, well supplied with excellent medicines, and enriched with a great number of porcelain vases from China and Japan. From one of the gates of the fort a draw-bridge is thrown over an arm of the river, in which the Czar's galleys and other small vessels are sheltered in the winter. The most remarkable building within the fort is the cathedral, built by the direction of an Italian architect. Petersburg is partly built on little islands, some of which are connected by draw-bridges; and partly on the continent. In the highest part, on the bank of the Neva, the Czar fixed his habitation, or ordinary residence, built of freestone, and situated so as to command a prospect of the greater part of the city. Here likewise is a royal foundry; together with the superb houses of many noblemen. The marshy ground on which the city is built, being found extremely slippery, dirty, and incommodious, the Czar ordered every inhabitant to pave a certain space before his own door. In the year 1716, Peter, taking a fancy to the island Wafli-Osterno, which he had given as a present to prince Menzikoff, resumed the grant, and ordered the city to be extended into this quarter. He even obliged the boyars, or nobles, to build stone-houses on this spot, though they were already in possession of others on the side of Ingria: accordingly this is now the most magnificent part of the city. On the other side of a branch of the Neva stands the Czar's country or summer palace, provided with a fine garden and orangery. On the bank of the same river is the slaboda, or suburbs, in which the Germans generally choose their habitation. Petersburg is very much subject to dangerous inundations. In the year 1715, all the bastions and draw-bridges were either overwhelmed or carried away. The breadth, depth, and rapidity of the Neva, have rendered it extremely difficult, if not impracticable, to join the islands and the continent by bridges. Besides, Peter was averse to this expedient for another reason: resolved to accustom his subjects to navigation, he not only rejected the project of a bridge, but also ordered that no boat should pass between the islands and continent, except by the help of sails only. In consequence of this strange regulation, many lives were lost: but at length he gained his point; and by habituating his sluggish Muscovites to the dangers of the sea, in a little time produced a breed of hardy sailors. The adjacent country is so barren, that the town must be supplied with provisions from a great distance; consequently they are extremely dear. Here are woods in plenty, consisting of pine, fir, alder, birch, poplar, and elm; but the oak and the beech are generally brought from Casan. In winter the weather is extremely cold, and hot in the summer. In June the length of the night does not exceed three hours, during which the natives

Petersburg. lives enjoy a continued twilight: but in December the sun is not visible more than three hours above the horizon.

The Czar Peter, who was indefatigable in his endeavours to improve and civilize his subjects, neglected nothing which he thought could contribute to these purposes. He condescended even to institute and regulate assemblies at Petersburg: these were opened at five in the afternoon, and the house was shut at ten: between these hours the fashionable people of both sexes met without ceremony, danced, conversed, or played either at cards or at chess, this last being a favourite diversion among the Russians. There was likewise an apartment appointed for drinking brandy and smoking tobacco. Plays and operas were likewise introduced for the same purposes; but as Peter had little relish, and less taste, for those entertainments, they were performed in a very awkward manner in his lifetime: however, since his death these performances have been brought to a greater degree of art and decorum.

This great northern legislator established, in the neighbourhood of Petersburg, manufactures of linen, paper, saltpetre, sulphur, gunpowder, and bricks, together with water-mills for sawing timber. He instituted a marine academy, and obliged every considerable family in Russia to send at least one son or kinsman, between the ages of ten and eighteen, to this seminary, where he was instructed in navigation, learned the languages, was taught to perform his exercises, and to live under the severest discipline. To crown his other plans of reformation, he granted letters patent for founding an academy, upon a very liberal endowment; and though he did not live to execute this scheme, his empress, who survived him, brought it to perfection. It was modelled on the plans of the royal society in London, and the academy of France. Mr Bullfinger opened it in the year 1726, with an eloquent speech on the design and utility of an academy of sciences; and the professors, who have always distinguished themselves by their merit and erudition, published an annual collection of their transactions; a task the more easy, as they have the benefit of printing-presses, well managed, at Petersburg.

Peter the Great has been much censured for transferring the seat of the empire from Moscow to St Petersburg; the former of which lay nearer to the centre of his dominions. But these objections will have but little weight with those who consider the consequences of the removal. The new city is nearer than Moscow was to the more civilized parts of Europe; and from an intercourse with them the manners of the Russians have been improved, and the nobility in particular have lost much of their feudal importance. Above all, the grand object of Peter, that of having a formidable navy in the Baltic, has certainly been obtained, and the Empress of Russia is now the arbitress of the north, and in some degree the mediatrix of all Europe. In short, the erection of St Petersburg was perhaps one of the best acts of Peter's reign, and has in its consequences been the most beneficial. Indeed it is at least probable, that if through any revolution the seat of government should be again transferred to Moscow, we should nowhere see the traces of those memorable

improvements, which the passing century has given Petersburg birth to, but in the annals of history; and Russia would again, in all probability, relapse into her original barbarism.

The erection of such a city as Petersburg in so short a time is truly wonderful. Mr Coxe says his mind was filled with astonishment, when he reflected that so late as the beginning of this century the ground on which it stands was one vast morass, occupied by a very few fishermen's huts. The present divisions of the town, some of which we have already mentioned, are called, 1. The Admiralty quarter; 2. The Vassili Ostrof or Island; 3. The Fortrefs; 4. The Island of St Petersburg; and, 5. The various suburbs of Livonia, of Moscow, of Alexander Nevski, and Wiburgh.

The present Empress has done so much for this city, that she may not improperly be called its second foundress. It is, nevertheless, still an infant place, and, as Mr Wraxhall observes, "only an immense outline, which will require future empresses, and almost future ages, to complete."

"The streets in general, says a late traveller, are *Coxe's Travels* broad and spacious; and three of the principal ones, *viz.* which meet in a point at the Admiralty, and reach to the extremities of the suburbs, are at least two miles in length. Most of them are paved; but a few are still suffered to remain floored with planks. In several parts of the metropolis, particularly in the Vassili Ostrof, wooden houses and habitations, scarcely superior to common cottages, are blended with the public buildings; but this motley mixture is far less common than at Moscow, where alone can be formed any idea of an ancient Russian city. The brick houses are ornamented with a white stucco, which has led several travellers to say that they are built with stone; whereas, unless I am greatly mistaken, there are only two stone structures in all Petersburg. The one is a palace, building by the empress upon the banks of the Neva, called *the marble palace*; it is of hewn granite, with marble columns and ornaments; the other is the church of St Isaac, constructed with the same materials, but not yet finished.

"The mansions of the nobility are many of them vast piles of building, but are not in general upon so large and magnificent a scale as several I observed at Moscow: they are furnished with great cost, and in the same elegant style as at Paris or London. They are situated chiefly on the south side of the Neva, either in the Admiralty quarter, or in the suburbs of Livonia and Moscow, which are the finest parts of the city." See NEVA.

"Petersburg, although it is more compact than the other Russian cities, and has the houses in many streets contiguous to each other, yet still bears a resemblance to the towns of this country, and is built in a very straggling manner. By an order lately issued from government, the city has been inclosed within a rampart, the circumference whereof is 21 versts, or 14 English miles."

The same accurate observer calculates the number of inhabitants at Petersburg, and makes the medium number 130,000.

We have already said that Petersburg is very liable to be inundated. An inundation of a very alarming nature took place when Mr Coxe was there in Sep-

tember

Peterburg. tember 1777, of which the following account was given in Journal St Petersburg, September 1777: "In the evening of the 9th, a violent storm of wind blowing at first S. W. and afterwards W. raised the Neva and its various branches to so great an height, that at five in the morning the waters poured over their banks, and suddenly overflowed the town, but more particularly the Vassili Ostrof and the island of St Petersburg. The torrent rose in several streets to the depth of four feet and an half, and overturned, by its rapidity, various buildings and bridges. About seven, the wind shifting to N. W. the flood fell as suddenly; and at mid-day most of the streets, which in the morning could only be passed in boats, became dry. For a short time the river rose 10 feet 7 inches above its ordinary level."

Mr Kraft, professor of experimental philosophy to the Imperial Academy of Sciences, has written a judicious treatise upon the inundation of the Neva, from which the following observations were extracted by Mr Coxe. "These floods are less alarming than formerly, as the swelling of the river to about six feet above its usual level, which used to overflow the whole town, have no longer any effect, excepting upon the lower parts of Petersburg; a circumstance owing to the gradual raising of the ground by buildings and other causes."

"Upon tracing the principal inundations, the professor informs us, that the most ancient, of which there is any tradition, happened in 1691, and is mentioned by Weber, from the account of some fishermen inhabiting near Nieschants, a Swedish redoubt upon the Neva, about three miles from the present fortress of Petersburg. At that period the waters usually rose every five years; and the inhabitants of that district no sooner perceived the particular storms which they had been taught from fatal experience to consider as forerunners of a flood, than they took their hovels to pieces, and, joining the timbers together in the form of rafts, fastened them to the summits of the highest trees, and repaired to the mountain of Duderof, which is distant six miles from their place of abode, where they waited until the waters subsided."

"The highest inundations, excepting the last of 1777, were those of the 1st of November 1726, when the waters rose 8 feet 2 inches; and on the 2d of October 1752, when they rose 8 feet 5 inches."

"From a long course of observations the professor draws the following conclusion. The highest floods, namely, those which rise about six feet, have generally happened in one of the four last months of the year: no sensible effect is ever produced by rain or snow; a swell is sometimes occasioned by the accumulation of masses of ice at the mouth of the Neva; but the principal causes of the overflowing of that river are derived from violent storms and winds blowing south west or north west, which usually prevail at the autumnal equinox; and the height of the waters is always in proportion to the violence and duration of those winds. In a word, the circumstances most liable to promote the overflowings of the Neva, are when, at the autumnal equinox, three or four days before or after the full or new moon, that luminary being near her perigæum, a violent north-west wind drives the waters of the northern ocean, during the influx of the tide,

into the Baltic, and is accompanied, or instantaneously succeeded, by a south-west wind in that sea and the gulf of Finland. All these circumstances concurred at the inundation of 1777: it happened two days before the autumnal equinox, four before the full moon, two after her passing through the perigæum, and by a storm at south-west, which was preceded by strong west winds in the northern ocean, and strong north winds at the mouth of the Baltic."

See *Notices et Remarques sur les débordemens de la Neva à St Petersburg, accompagnées d'une carte représentant la crue et la diminution des eaux, &c.* in Nov. Ac. Pet. for 1777, P. II. p. 47. to which excellent treatise we would refer the curious reader for further information.

All our readers have unquestionably heard of the equestrian statue of Peter I. in bronze. We shall give an account of that extraordinary monument in Mr Coxe's own words. "It is (says he) of a colossal size, and is the work of Monsieur Falconet, the celebrated French statuary, cast at the expence of Catherine II. in honour of her great predecessor, whom she revered and imitates. It represents that monarch in the attitude of mounting a precipice, the summit of which he has nearly attained. He appears crowned with laurel, in a loose Asiatic vest, and sitting on a housing of bear-skin: his right hand is stretched out as in the act of giving benediction to his people; and his left holds the reins. The design is masterly, and the attitude is bold and spirited. If there be any defect in the figure, it consists in the flat position of the right hand; and, for this reason, the view of the left side is the most striking, where the whole appearance is graceful and animated. The horse is rearing upon its hind legs; and its tail, which is full and flowing, slightly touches a bronze serpent, artfully contrived to assist in supporting the vast weight of the statue in due equilibrium. The artist has, in this noble essay of his genius, represented Peter as the legislator of his country, without any allusion to conquest and bloodshed; wisely preferring his civil qualities to his military exploits. The contrast between the composed tranquillity of Peter (though perhaps not absolutely characteristic) and the fire of the horse, eager to press forwards, is very striking. The simplicity of the inscription corresponds to the sublimity of the design, and is far preferable to a pompous detail of exalted virtues, which the voice of flattery applies to every sovereign without distinction. It is elegantly finished in brass characters, on one side in Latin, and on the opposite in Russian. *Petro primo Catharina secunda 1782, i. e. Catharine II. to Peter I.*

"The statue, when I was at Peterburgh, was not erected, but stood under a large wooden shed near the Neva, within a few yards of its enormous pedestal. When Falconet had conceived the design of his statue, the base of which was to be formed by an huge rock, he carefully examined the environs of Peterburgh, if, among the detached pieces of granite which are scattered about these parts, one could be found of magnitude correspondent to the dimensions of the equestrian figure. After considerable research, he discovered a stupendous mass half buried in the midst of a morass. The expence and difficulty of transporting it were no obstacles to Catherine II. By her order the

Petersburg. the morass was immediately drained, a road was cut through a forest, and carried over the marshy ground; and the stone, which after it had been somewhat reduced weighed at least 1500 tons, was removed to Petersburg. This more than Roman work was, in less than six months from the time of its first discovery, accomplished by a windlass, and by means of large friction-balls alternately placed and removed in grooves fixed on each side of the road. In this manner it was drawn, with forty men seated upon its top, about four miles to the banks of the Neva; there it was embarked in a vessel constructed on purpose to receive it, and thus conveyed about the same distance by water to the spot where it now stands. When landed at Petersburg, it was 42 feet long at the base, 36 at the top, 21 thick, and 17 high; a bulk greatly surpassing in weight the most boasted monuments of Roman grandeur, which, according to the fond admirers of antiquity, would have baffled the skill of modern mechanics, and were alone sufficient to render conspicuous the reign of the most degenerate emperors.

"The pedestal, however, though still of prodigious magnitude, is far from retaining its original dimensions, as, in order to form a proper station for the statue, and to represent an ascent, the summit whereof the horse is endeavouring to attain, its bulk has been necessarily diminished. But I could not observe, without regret, that the artist has been desirous to improve upon nature; and, in order to produce a resemblance of an abrupt broken precipice, has been too lavish of the chisel. Near it was a model in plaster, to the shape of which the workmen were fashioning the pedestal. It appeared to me, that in this model the art was too conspicuous; and that the effect would have been far more sublime, if the stone had been left as much as possible in its rude state, a vast unwieldy stupendous mass. And indeed, unless I am greatly mistaken, the pedestal, when finished according to this plan, will have scarcely breadth sufficient to afford a proper base for a statue of such Colossal size.

"The statue was erected on the pedestal on the 27th of August 1782. The ceremony was performed with great solemnity, and was accompanied with a solemn inauguration. At the same time the empress issued a proclamation, in which, among other instances of her clemency, she pardons all criminals under sentence of death; all deserters, who should return to their respective corps within a limited time; and releases all criminals condemned to hard labour, provided they had not been guilty of murder."

Mr Coxe informs us, that the weather is extremely changeable in this capital, and the cold is at times extreme; against which the inhabitants take care to provide (see PEASANT), though some of them nevertheless unfortunately fall victims to it. "As I traversed the city, says Mr Coxe, on the morning of 12th January, I observed several persons whose faces had been bitten by the frost: their cheeks had large scars, and appeared as if they had been singed with an hot iron. As I was walking with an English gentleman, who, instead of a fur cap, had put on a common hat, his ears were suddenly frozen: he felt no pain, and would not have perceived it for some time, if a Russian, in passing by, had not informed him of it, and assisted him in rubbing the part affected with snow, by which means it

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was instantly recovered. This, or friction with flannel, is the usual remedy; but should the person in that state approach the fire, or dip the part in warm water, it immediately mortifies and drops off.—The common people continued at their work as usual, and the drivers plied in the streets with their sledges seemingly unaffected by the frost; their beards were incrustated with clotted ice, and the horses were covered with icicles.

"It sometimes happens that coachmen or servants, while they are waiting for their masters, are frozen to death. In order to prevent as much as possible these dreadful accidents, great fires of whole trees, piled one upon another, are kindled in the court-yard of the palace and the most frequented parts of the town. As the flames blazed above the tops of the houses, and cast a glare to a considerable distance, I was frequently much amused by contemplating the picturesque groups of Russians, with their Asiatic dress and long beards, assembled round the fire. The centinels upon duty, having no beards, which are of great use to protect the glands of the throat, generally tie handkerchiefs under their chins, and cover their ears with small caps of flannel."

PETERSBURG, in America, is a sea-port town in Virginia, 25 miles southward of Richmond, seated on the south side of the Appamatox river, about 12 miles above its junction with James River, and contained nearly 300 houses in 1787, in two divisions; one is upon a clay, cold soil, and is very dirty; the other upon a plain of sand or loam. There is no regularity, and very little elegance in Petersburg. It is merely a place of business. The Free Masons have a hall tolerably elegant; and the seat of the Bowling family is pleasant and well built. It is very unhealthy. About 2200 hogheads of tobacco are inspected here annually. Like Richmond, Williamsburg, Alexandria, and Norfolk, it is a corporation; and what is singular, Petersburg city comprehends part of three counties. The celebrated Indian queen, Pocahontas, from whom descended the Randolph and Bowling families, formerly resided at this place.

PETERSFIELD, is a handsome town of Hampshire in England, and sends two members to parliament. It is seated in W. Long. 1. 5. N. Lat. 51. 5.

PETERWARADIN, a fortified town in Sclavonia, and one of the strongest frontier places the house of Austria has against the Turks, seated on the Danube between the Drave and the Save. E. Long. 20. 0. N. Lat. 45. 20.

PETIOLE, in botany, the slender stalks that support the leaves of a plant.

PETIT, or PETITE, a French word signifying little or small.

PETITE Guerre, denotes the operations of detached parties and the war of posts. See WAR, Part III.

PETIT Sergeanty. See SERGEANTY.

PETIT Treason. See TREASON.

PETIT (John), a doctor of the Sorbonne, very early gained to himself a character by his knowledge, and those eloquent orations which he pronounced before the university of Paris. He was employed in the famous embassy which was sent from France to Rome, for the purpose of healing the schism in 1407; but he soon lost all the honour which he had acquired. John

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Sans Peur, duke of Burgundy, having treacherously contrived to assassinate Louis of France, duke of Orleans, only brother to Charles VI. John Petit, entirely devoted to the views of the murderer, maintained in a public disputation, at Paris, the 8th of March 1408, that the murder was lawful. He had the effrontery to assert, that "it is allowable to employ fraud, treason, and every other method, however base, in order to get rid of a tyrant; and that no faith ought to be kept with him." He dared to add further, that "the man who should commit such an action, not only deserved to be exempted from punishment, but to receive a reward." This sanguinary doctrine was loudly exclaimed against; but the duke of Burgundy's powerful influence sheltered Petit for some time. Some eminent writers, however, of that period, with Gerson at their head, denounced the doctrine to John de Montaignu, bishop of Paris, who condemned it as heretical the 23d November 1414. It was likewise condemned by the council of Constance the year following at the instigation of Gerson; but no notice was taken either of Petit's name or his writings. In fine, the king, on the 16th of September 1416, ordered the parliament of Paris to pronounce a severe decree against this dangerous performance; and it was also censured by the university. But the duke of Burgundy, in 1418, had interest enough to compel the grand vicars of the bishop of Paris, who then lay sick at St Omer's, to retract the sentence which that prelate had past in 1414. Petit died three years before, *i. e.* in 1411, at Hesdin; and his apology in favour of the duke of Burgundy, with all the particulars of that infamous transaction, may be seen in the fifth volume of the last edition of Gerson's works. Father Pinchinat, of the order of St Francis, and author of the Dictionary of Heresies, in 4to, has endeavoured to vindicate his order from a charge brought by some writers who have called Petit a *Cordelier* or *Franciscan friar*. "He proves very clearly (says Abbé Prevot) that he was a secular priest; and adds, that upon the same evidence, Father Mercier, a Cordelier, had a warm dispute in 1717 with M. Dupin, who had given this title to Petit in his Collection of Censures. He represented to him (says he), before a meeting of the Faculty, the falsity of such a claim, and the injury which he offered to the order of St Francis. Dupin, convinced of his error, candidly owned that he was led into it by following some infidel writers, and promised to retract it in the new edition of the Censures, which was published in 1720. M. Fleury, who had committed the same mistake, promised also to make amends for it by a solemn recantation; but dying before he had an opportunity of doing that piece of justice to the Cordeliers, the continuator of his Ecclesiastical History, who had not such opportunities of information, fell into the same fault." (*Pour & contre*, tom. x. p. 23.) If we take the opinion of L'Advocal's Dictionary, it would appear no fault was committed; for it gives a list of the pensioners of the dukes of Burgundy, in order to prove that John Petit was a Cordelier. Indeed, it is highly probable that if Dupin, Fleury, and Father Fabré, did not alter their opinion, it was owing to a firm persuasion that they had committed no error.

PETIT (John Lewis), an eminent surgeon, born at Paris in 1674. He had so early an inclination to

surgery, that Mr Littre, a celebrated anatomist, being in his father's house, he regularly attended that gentleman's lectures, from his being seven years of age. He was received master in surgery in the year 1700; and acquired such reputation in the practice of that art, that in 1726 the king of Poland sent for him to his court, and in 1734 the king of Spain prevailed on him to go into that kingdom. He restored the health of those princes; and they endeavoured to detain him by offering him great advantages, but he chose rather to return to France. He was received into the academy of sciences in 1715; became director of the royal academy of surgery; made several important discoveries; and invented new instruments for the improvement of surgery. He died at Paris in 1750. He wrote an excellent Treatise on the Diseases of the Bones, the best edition of which is that of 1723; and many learned Dissertations in the Memoirs of the Academy of Sciences, and in the first volume of the Memoirs of Surgery.

PETITIO PRINCIPII, in logic, the taking a thing for true, and drawing conclusions from it as such, when it is really false; or—at least wants to be proved before any inferences can be drawn from it.

PETITION, a supplication made by an inferior to a superior, and especially to one having jurisdiction. It is used for that remedy which the subject hath to help a wrong done by the king, who hath a prerogative not to be sued by writ: In which sense it is either general, That the king do him right; whereupon follows a general indorsement upon the same, *Let right be done the party*: Or it is special, when the conclusion and indorsement are special, for this or that to be done, &c.

By statute, the soliciting, labouring, or procuring the putting the hands or consent of above twenty persons to any petition to the king or either house of parliament, for alterations in church or state, unless by assent of three or more justices of the peace of the county, or a majority of the grand jury at the assizes or sessions, &c. and repairing to the king or parliament to deliver such petition with above the number of ten persons, is subject to a fine of 100 l. and three months imprisonment, being proved by two witnesses within six months, in the court of B. R. or at the assizes, &c. And if what is required by this statute be observed, care must be taken that petitions to the king contain nothing which may be interpreted to reflect on the administration; for if they do, it may come under the denomination of a libel: and it is remarkable, that the petition of the city of London for the sitting of a parliament was deemed libellous, because it suggested that the king's dissolving a late parliament was an obstruction of justice; also the petition of the seven bishops, sent to the Tower by James II. was called a libel, &c. To subscribe a petition to the king, *to frighten him into a change of his measures, intimating, that if it be denied many thousands of his subjects will be discontented*, &c. is included among the contempts against the king's person and government, tending to weaken the same, and is punishable by fine and imprisonment.

PETITORY ACTION, in Scots law. See LAW, N^o clxxxiii, 18. 20.

PETITOT (John), a curious painter in enamel,

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was born at Geneva in 1607. He studied the art with such application, that he arrived to a degree of perfection that may almost be accounted inimitable. He was wonderfully patient in finishing his works, though he had the address to conceal his labour: however, he only painted the heads and hands of the figures: the hair, grounds, and drapery, being executed by Bordier his brother-in-law. These two artists had the credit of associating and labouring together for fifty years, without the least misunderstanding happening between them. It is asserted by an ingenious French writer, that Petitot and Bordier derived the knowledge of the most curious and durable colours proper for enamelling, from Sir Theodore Mayerne at London, who recommended Petitot to Charles I. He had the honour to paint the portraits of that monarch and the whole royal family, and continued in England until Charles's unhappy end: he then went to Paris, where he was highly favoured by Louis XIV. and acquired an ample fortune. Being a Protestant, the revocation of the edict of Nantz obliged him to retire to Geneva; but settling soon after at Veray in the canton of Bern, he passed the remainder of his life in ease and affluence. He died in 1691; and had 17 children: of whom one took to painting, and settled at London, where he gained good reputation; but was much inferior to his father.

Petitot may be called the inventor of painting portraits in enamel. Though his friend Bordier made several attempts before him, and Sir Theodore Mayerne had facilitated the means of employing the most beautiful colours; yet Petitot completed the works, which under his hand acquired a softness and liveliness of colouring that will never change, and will ever render his works valuable. He made use of gold and silver plates, and seldom enamelled on copper. When he first came in vogue, his price was 20 louis's a head, which he soon raised to 40. It was his custom to take a painter with him, who painted the picture in oil; after which Petitot sketched out his work, which he always finished after the life. When he painted the king of France, he took those pictures for his copies that most resembled him; and the king afterwards gave him a sitting or two to finish his work.

PETIVERIA, in botany: A genus of the tetragynia order, belonging to the hexandria class of plants; and in the natural method ranking under the 12th order, *Holorææ*. The calyx is tetraphyllous; there is no corolla; and but one seed, with reflexed awns at the top.

PETRA (Cæsar, Lucian), a town of Greece, on the coast of Illyricum, near Dyrrhachium, and not far from the mouth of the river Panyasus.—Another PETRA, (Livy); a town of Mædica, a district of Thrace, lying towards Macedonia; but in what part of Macedonia, he does not say.

PETRA (Ptolemy), *Petræa* (Silius Italicus), *Petrina* (Italicus), in both which last *urbs* is understood; an inland town of Sicily, to the south-west of Engyum, Now *Petraglia* (Cluverius).

PETRA *Jecktael* (2 Kings xiv.), a town of the Amalekites; near the Adscensus Scorpionis (Judges i.) and the valley of Salt in the south of Judæa: afterwards in the possession of the Edomites, after destroying the Amalekites.

PETRA *Recem*, or *Rekem*, so called from *Rekem* king of the Midianites, slain by the Israelites (Num. xxxi.) Formerly called *Arce*, now *Petra*; the capital of Arabia *Petræa* (Josephus). Ptolemy places it in Long. 66. 45. from the Fortunate Islands, and Lat. 30. 20. It declines therefore 80 miles to the south of the parallel of Jerusalem, and 36 miles, more or less, from its meridian to the east. Josephus says, that the mountain on which Aaron died stood near Petra; which Strabo calls the capital of the Nabatæi; at the distance of three or four days journey from Jericho. This Petra seems to be the Sela of Isaiah xvi. 1. and xlii. 11. the Hebrew name of *Petra* "a rock:" Though some imagine Petra to be no older than the time of the Macedonians.

PETRARCH (Francis), a celebrated Italian poet, was born at Arezzo in 1304, and was the son of Petrarco di Parenzo. He studied grammar, rhetoric, and philosophy, for four years at Carpentras; from whence he went to Montpellier, where he studied the law under John Andreas and Cino of Pistoia, and probably from the latter received a taste for Italian poetry. As Petrarch only studied the law out of complaisance to his father, who on his visiting him at Bologna had thrown into the fire all the Latin poets and orators except Virgil and Cicero; he, at 22 years of age, hearing that his father and mother were dead of the plague at Avignon, returned to that city to settle his domestic affairs, and purchased a country-house in a very solitary but agreeable situation, called *Vauchuse*; where he first knew the beautiful Laura, with whom he fell in love, and whom he has immortalised in his poems. He at length travelled into France, the Netherlands, and Germany; and at his return to Avignon entered into the service of Pope John XXII. who employed him in several important affairs. Petrarch was in hopes of being raised to some considerable posts: but being disappointed, he applied himself entirely to poetry; in which he met with such applause, that in one and the same day he received letters from Rome and the chancellor of the university of Paris, by which they invited him to receive the poetic crown. By the advice of his friends, he preferred Rome to Paris, and received that crown from the senate and people on the 8th of April 1341. "The ceremony of his coronation (says Gibbon) was performed in the Capitol, by his friend and patron the supreme magistrate of the republic. Twelve patrician youths were arrayed in scarlet; six representatives of the most illustrious families, in green robes, with garlands of flowers, accompanied the procession; in the midst of the princes and nobles, the senator, count of Anguillara, a kinsman of the Colonna, assumed his throne; and at the voice of an herald Petrarch arose. After discoursing on a text of Virgil, and thrice repeating his vows for the prosperity of Rome, he knelt before the throne, and received from the senator a laurel crown, with a more precious declaration, "This is the reward of merit." The people shouted, "Long life to the Capitol and the poet!" A sonnet in praise of Rome was accepted as the effusion of genius and gratitude; and after the whole procession had visited the Vatican, the profane wreath was suspended before the shrine of St Peter. In the act or diploma which was presented to Petrarch, the

Petra,
Petrarch.

Petrarch. title and prerogatives of poet-laureat are revived in the Capitol after the lapse of 1300 years; and he receives the perpetual privilege of wearing, at his choice, a crown of laurel, ivy, or myrtle; of assuming the poetic habit; and of teaching, disputing, interpreting, and composing, in all places whatsoever, and on all subjects of literature. The grant was ratified by the authority of the senate and people; and the character of citizen was the recompense of his affection for the Roman name. They did him honour, but they did him justice. In the familiar society of Cicero and Livy, he had imbibed the ideas of an ancient patriot; and his ardent fancy kindled every idea to a sentiment, and every sentiment to a passion." His love of solitude at length induced him to return to Vacluse; but, after the death of the beautiful Laura, Provence became insupportable to him, and he returned to Italy in 1352; when, being at Milan, Galeas Viceconti made him counsellor of state. Petrarch spent almost all the rest of his life in travelling to and from the different cities in Italy. He was archdeacon of Parma, and canon of Padua; but never received the order of priesthood. All the princes and great men of his time gave him public marks of their esteem; and while he lived at Arcqua, three miles from Padua, the Florentines deputed Boccace to go to him with letters, by which they invited him to Florence, and informed him, that they restored to him all the estate of which his father and mother had been deprived during the dissensions between the Guelphs and Ghibelines. He died a few years after at Arcqua, in 1374. He wrote many works that have rendered his memory immortal; these have been printed in four volumes folio. His life has been written by several authors. Amongst these there was one by Mrs Susanna Dobson, in 2 volumes 8vo, collected and abridged from the French. In this work we have the following elegant and just character of Petrarch.

"Few characters, perhaps, have set in a stronger light the advantage of well-regulated dispositions than that of Petrarch, from the contrast we behold in one particular of his life, and the extreme misery he suffered from the indulgence of an affection, which, though noble and delightful when justly placed, becomes a reproach and a torment to its possessor when once directed to an improper object. For, let us not deceive ourselves or others; though (from the character of Laura) they are acquitted of all guilt in their personal intercourse, yet, as she was a married woman, it is not possible, on the principles of religion and morality, to clear them from that just censure which is due to every defection of the mind from those laws which are the foundation of order and peace in civil society, and which are stamped with the sacred mark of divine authority.

"In this particular of his character, therefore, it is sincerely hoped that Petrarch will serve as a warning to those unhappy minds, who, partaking of the same feelings under the like circumstances, but not yet suffering his misery, may be led, by the contemplation of it, by a generous regard to the honour of human nature, and by a view to the approbation of that all-seeing Judge who penetrates the most secret recesses of the heart, to check every unhappy inclination in its birth, and destroy, while yet in their power

Petrarch. the seeds of those passions which may otherwise destroy them.

"As to the cavils or censures of those who, incapable of tenderness themselves, can neither enjoy the view of it when presented in its most perfect form, nor pity its sufferings when, as in this work, they appear unhappily indulged beyond the bounds of judgment and tranquillity; to such minds I make no address, well convinced, that, as no callous heart can enjoy, neither will it ever be in danger of being misled, by the example of Petrarch in this tender but unfortunate circumstance of his character.

"To susceptible and feeling minds alone Petrarch will be ever dear. Such, while they regret his failings, and consider them as warnings to themselves, will love his virtues; and, touched by the glowing piety and heart-felt contrition which often impressed his soul, will ardently desire to partake with him in those pathetic and sublime reflections which are produced in grateful and affectionate hearts, on reviewing their own lives, and contemplating the works of God.

"Petrarch had received from nature a very dangerous present. His figure was so distinguished as to attract universal admiration. He appears, in his portraits, with large and manly features, eyes full of fire, a blooming complexion, and a countenance that bespoke all the genius and fancy which shone forth in his works. In the flower of his youth, the beauty of his person was so very striking, that wherever he appeared, he was the object of attention. He possessed an understanding active and penetrating, a brilliant wit, and a fine imagination. His heart was candid and benevolent, susceptible of the most lively affections, and inspired with the noblest sentiments of liberty.

"But his failings must not be concealed. His temper was, on some occasions, violent, and his passions headstrong and unruly. A warmth of constitution hurried him into irregularities, which were followed with repentance and remorse.—No essential reproach, however, could be cast on his manners, till after the 23d year of his age. The fear of God, the thoughts of death, the love of virtue, and those principles of religion which were inculcated by his mother, preserved him from the surrounding temptations of his earlier life."

A resemblance has been traced, in several instances, between this admired poet and our late famous Yorick.—Both, we know, had great wit and genius, and no less imprudence and eccentricity; both were canons, or prebendaries, the Italian of Padua, &c. and the Englishman of York; they both "ran over France, without any business there." If the bishop of Lombes patronised and corresponded with the one, a prelate of the English church, now deceased, desired, in a letter, to *bandyise* || with the other. In their attachments to Laura and Eliza, both married women, these two prebendaries were equally warm, and equally innocent. And, even after death, a most remarkable circumstance has attended them both; some persons, we are told, stole Petrarch's bones, in order to sell them; and, in like manner, Yorick's body, it is confidently affirmed, was also stolen, and his skull has been exhibited at Oxford.

PETRE,

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Petrifac-
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PETRE, or SALTPETRE, in chemistry. See CHEMISTRY, n^o 724, &c.

PETREA, in botany: A genus of the angiosperma order, belonging to the didynamia class of plants; and in the natural method ranking under the 4th order, *Perfonate*. The calyx is quinquepartite, very large, and coloured; the corolla rotaceous; the capsule bilocular, and situated in the bottom of the calyx; the seeds solitary. There is only one species, a native of New Spain. It rises to the height of 15 or 16 feet, with a woody stalk covered with grey bark, sending out several long branches. These have a whiter bark than the stem, and are garnished with leaves at each joint, which, on the lower part of the branches, are placed by three round them; but, higher up, they are rough, and have a rough surface. The flowers are produced at the ends of the branches, in loose bunches nine or ten inches long, each flower standing on a slender flower-stalk about an inch long: the empalement of the flower is composed of five narrow obtuse leaves about an inch long, which are of a fine blue colour, and much more conspicuous than the petals, which are white, and not more than half the length of the empalement. The plant is propagated by seeds procured from the places where they are natives, and of which very few are good; for though Dr Houston, the discoverer of the plant, sent parcels of seeds to several persons in England, only two plants were produced from the whole. The seeds must be sown in a good hot-bed; and when the plants come up, they should all be planted in a separate small pot filled with light loamy earth, and plunged into a hot-bed of tanners bark, where they should afterwards constantly remain.

PETREL, in ornithology. See PROCELLARIA.

PETRIDIA, in natural history, a genus of scrupi, of a plain, uniform texture; of no great variety of colours, and emulating the external form of pebbles.

PETRIFICATION, in physiology, denotes the conversion of wood, bones, and other substances, principally animal or vegetable, into stone. These bodies are more or less altered from their original state, according to the different substances they have lain buried among in the earth; some of them having suffered very little change, and others being so highly impregnated with crystalline, sparry, pyritical, or other extraneous matter, as to appear mere masses of stone or lumps of the matter of the common pyrites; but they are generally of the external dimensions, and retain more or less of the internal figure, of the bodies into the pores of which this matter has made its way. The animal-substances thus found petrified are chiefly sea-shells; the teeth, bony palates, and bones, of fish; the bones of land-animals, &c. These are found variously altered, by the insinuation of stony and mineral matter into their pores; and the substance of some of them is now wholly gone, there being only stony, sparry, or other mineral matter remaining in the shape and form.

Respecting the manner in which petrification is accomplished, we know but little. It has been thought by many philosophers, that this was one of the rare processes of nature; and accordingly such places as afforded a view of it, have been looked upon as great curiosities. However, it is now discovered, that pe-

trification is exceedingly common; and that every kind of water carries in it some earthy particles, which being precipitated from it, become stone of a greater or lesser degree of hardness; and this quality is most remarkable in those waters which are much impregnated with selenitic matter. Of late, it has also been found by some observations on a petrification in East Lothian in Scotland, that iron contributes greatly to the process: and this it may do by its precipitation of any aluminous earth which happens to be dissolved in the water by means of an acid; for iron has the property of precipitating this earth, though it cannot precipitate the calcareous kind. The calcareous kinds of earth, however, by being soluble in water without any acid, must contribute very much to the process of petrification, as they are capable of a great degree of hardness by means only of being joined with fixed air, on which depends the solidity of our common cement or mortar used in building houses.

The name *petrification* belongs only, as we have seen, to bodies of vegetable or animal origin; and in order to determine their class and genus, or even species, it is necessary that their texture, their primitive form, and in some measure their organization, be still discernible. Thus we ought not to place the stony kernels, moulded in the cavity of some shell, or other organized body, in the rank of petrifications properly so called.

Petrifications of the vegetable kingdom are almost all either gravelly or siliceous; and are found in gullies, trenches, &c. Those which strike fire with steel are principally found in sandy fissures; those which effervesce in acids are generally of animal origin, and are found in the horizontal beds of calcareous earth, and sometimes in beds of clay or gravel; in which case the nature of the petrification is different. As to the substances which are found in gypsum, they seldom undergo any alteration, either with respect to figure or composition, and they are very rare.

Organized bodies, in a state of petrification, generally acquire a degree of solidity of which they were not possessed before they were buried in the earth, and some of them are often fully as hard as the stones or matrices in which they are enveloped. When the stones are broken, the fragments of petrifications are easily found, and easily distinguished. There are some organized bodies, however, so changed by petrification, as to render it impossible to discover their origin. That there is a matter more or less agitated, and adapted for penetrating bodies, which crumbles and separates their parts, draws them along with it, and disperses them here and there in the fluid which surrounds them, is a fact of which nobody seems to entertain any doubt. Indeed we see almost every substance, whether solid or liquid, insensibly consume, diminish in bulk, and at last, in the lapse of time, vanish and disappear.

A petrified substance, strictly speaking, is nothing more than the skeleton, or perhaps image, of a body which has once had life, either animal or vegetable, combined with some mineral. Thus petrified wood is not in that state wood alone. One part of the compound or mass of wood having been destroyed by local causes, has been compensated by earthy and sandy substances, diluted and extremely minute, which the

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P. 35.

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waters surrounding them had deposited while they themselves evaporated. These earthy substances, being then moulded in the skeleton, will be more or less indurated, and will appear to have its figure, its structure, its size, in a word, the same general characters, the same specific attributes, and the same individual differences. Farther, in petrified wood, no vestige of ligneous matter appears to exist. We know that common wood is a body in which the volume of solid parts is greatly exceeded by that of the pores. When wood is buried in certain places, lapidific fluids, extremely divided and sometimes coloured, insinuate themselves into its pores and fill them up. These fluids are afterwards moulded and condensed. The solid part of the wood is decomposed and reduced into powder, which is expelled without the mass by aqueous filtrations. In this manner, the places which were formerly occupied by the wood are now left empty in the form of pores. This operation of nature produces no apparent difference either of the size or of the shape; but it occasions, both at the surface and in the inside, a change of substance, and the ligneous texture is inverted; that is to say, that which was pore in the natural wood, becomes solid in that which is petrified; and that which was solid or full in the first state, becomes porous in the second. In this way, says M. Musard, petrified wood is much less extended in pores than solid parts, and at the same time forms a body much more dense and heavy than the first. As the pores communicate from the circumference to the centre, the petrification ought to begin at the centre, and end with the circumference of the organic body subjected to the action of the lapidific fluids. Such is the origin of petrifications. They are organized bodies which have undergone changes at the bottom of the sea or the surface of the earth, and which have been buried by various accidents at different depths under the ground.

In order to understand properly the detail of the formation of petrified bodies, it is necessary to be well acquainted with all their constituent parts. Let us take wood for an example. Wood is partly solid and partly porous. The solid parts consist of a substance, hard, ligneous, and compact, which forms the support of the vegetable; the porous parts consist of vessels or interstices which run vertically and horizontally across the ligneous fibres, and which serve for conducting air, lymph, and other fluids. Among these vessels, the trachizæ which rise in spiral forms, and which contain only air, are easily distinguished. The cylindric vessels, some of which contain lymph, and others the *succus proprius*, are full only during the life of the vegetable. After its death they become vacant by the evaporation and absence of the fluids with which they were formerly filled. All these vessels, whether ascending or descending, unite with one another, and form great cavities in the wood and in the bark. According to Malpighi and Duhamel, the ligneous fibres are themselves tubular, and afford a passage to certain liquors; in short, the wood and bark are interspersed with utriculi of different shapes and sizes. The augmentation of the trunk in thickness, according to Malpighi, is accomplished by the annual addition of a new exterior covering of fibres and of trachizæ. Others think that a concentric layer of sap-wood is

every year hardened, whilst a new one is forming from the bark. But it is on all sides agreed that the concentric layers of wood are distinct from one another, because at the point of contact betwixt any two of them, the new vessels, as well as new fibres, are more apparent and perceptible than they are in any other place. Having made these preliminary remarks on the structure of vegetables, we shall now proceed to give an abridged account of the manner in which M. Mongez explains their petrification.

In proportion to the tenderness and bad quality of wood, it imbibes the greater quantity of water; therefore this sort will unquestionably petrify more easily than that which is hard. It is thought that all the petrified wood so often found in Hungary has been originally soft, such as firs or poplars. Suppose a piece of wood buried in the earth; if it be very dry, it will suck up the moisture which surrounds it like a sponge. This moisture, by penetrating it, will dilate all the parts of which it is composed. The trachizæ, or air-vessels, will be filled first, and then the lymphatic vessels and those which contain the *succus proprius*, as they are likewise empty. The water which forms this moisture keeps in dissolution a greater or a less quantity of earth; and this earth, detached, and carried along in its course, is reduced to such an attenuated state, that it escapes our eyes and keeps itself suspended, whether by the medium of fixed air or by the motion of the water. Such is the lapidific fluid. Upon evaporation, or the departure of the menstruum, this earth, sand, or metal, again appears in the form of precipitate or sediment in the cavities of the vessels, which by degrees are filled with it. This earth is there moulded with exactness: The lapse of time, the simultaneous and partial attraction of the particles, make them adhere to one another; the lateral suction of the surrounding fibres, the obstruction of the moulds, and the hardening of the moulded earth, become general; and there consists nothing but an earthy substance which prevents the sinking of the neighbouring parts. If the deposit is formed of a matter in general pretty pure, it preserves a whiter and clearer colour than the rest of the wood; and as the concentric layers are only perceptible and distinct in the wood, because the vessels are there more apparent on account of their size, the little earthy cylinders, in the state of petrified wood, must be there a little larger, and consequently must represent exactly the turnings and separations of these layers. At the place of the utriculi, globules are observed, of which the shapes are as various as the moulds wherein they are formed. The anastomoses of the proper and lymphatic vessels, form besides points of support or reunion for this stony substance.

With regard to holes formed by worms in any bits of wood, before they had been buried in the earth, the lapidific fluid, in penetrating these great cavities, deposits there as easily the earthy sediment, which is exactly moulded in them. These vermiform cylinders are somewhat less in bulk than the holes in which they are found, which is owing to the retreat of the more refined earth and to its drying up.

Let any one represent to himself this collection of little cylinders, vertical, horizontal, inclined in different directions, the stony masses of utriculi and of anastomoses,

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tomoses, and he will have an idea of the stony substance which forms the ground-work of petrification. Hitherto not a single ligneous part is destroyed; they are all existing, but surrounded on every side with earthy deposits; and that body which, during life, was composed of solid and of empty parts, is now entirely solid: its destruction and decomposition do not take place till after the formation of these little deposits. In proportion as the water abandons them, it penetrates the ligneous substance, and destroys it by an insensible fermentation. The woody fibres being decomposed, form in their turn voids and interstices, and there remains in the whole piece nothing but little stony cylinders. But in proportion as these woody fibres disappear, the surrounding moisture, loaded with earth in the state of dissolution, does not fail to penetrate the piece of wood, and to remain in its new cavities. The new deposit assumes exactly the form of decomposed fibres; it envelopes in its turn the little cylinders which were formed in their cavities, and ends by incorporating with them. We may suppose here, that in proportion as it decomposes, there is a reaction of the ligneous part against the lapidific fluid: from this reaction a colour arises which stains more or less the new deposit; and this colour will make it easily distinguishable from that which has been laid in the inside of the vessels. In all petrified wood this shade is generally perceptible.

We have then, says M. Mongez, four distinct epochs in the process by which nature converts a piece of wood into stone, or, to speak more justly, by which she substitutes a stony deposit in its place: 1. Perfect vegetable wood, that is to say, wood composed of solid and of empty parts, of ligneous fibres, and of vessels. 2. Wood having its vessels obstructed and choaked up by an earthy deposit, while its solid parts remain unaltered. 3. The solid parts attacked and decomposed, forming new cavities betwixt the stony cylinders, which remain in the same state, and which support the whole mass. 4. These new cavities filled with new deposits, which incorporate with the cylinders, and compose nothing else but one general earthy mass representing exactly the piece of wood.

Among the petrifications of vegetables called *dendrolites*, are found parts of shrubs, stems, roots, portions of the trunk, some fruits, &c. We must not, however, confound the impressions of mosses, ferns, and leaves, nor incrustations, with petrifications.

Among the petrifications of animals, we find shells, crustaceous animals, polyparii, some worms, the bony parts of fishes and of amphibious animals, few or no real insects, rarely birds and quadrupeds, together with the bony portions of the human body. The cornua ammonis are petrified serpents; and with regard to figured and accidental bodies, these are *lusus naturæ*.

In order, says M. Bertrand, in his *Dictionnaire des Fossiles*, that a body should become petrified, it is necessary that it be, 1. Capable of preservation under ground: 2. That it be sheltered from the air and running water (the ruins of Herculaneum prove that bodies which have no connection with free air, preserve themselves untouched and entire). 3. That it be secured from corrosive exhalations. 4. That it be in a place where there are vapours or liquids, loaded either with metallic or stony particles in a state of dissolution,

and which, without destroying the body, penetrate it, impregnate it, and unite with it in proportion as its parts are dissipated by evaporation.

It is a question of great importance among naturalists, to know the time which Nature employs in petrifying bodies of an ordinary size.—It was the wish of the late emperor, Duke of Lorraine, that some means should be taken for determining this question. M. le Chevalier de Baillu, director of the cabinet of natural history of his imperial majesty, and some other naturalists, had, several years ago, the idea of making a research which might throw some light upon it. His imperial majesty being informed by the unanimous observations of modern historians and geographers, that certain pillars which are actually seen in the Danube in Gervia, near Belgrade, are remains of the bridge which Trajan constructed over that river, presumed that these pillars having been preserved for so many ages behoved to be petrified, and that they would furnish some information with regard to the time which nature employs in changing wood into stone. The emperor thinking this hope well founded, and wishing to satisfy his curiosity, ordered his ambassador at the court of Constantinople to ask permission to take up from the Danube one of the pillars of Trajan's bridge. The petition was granted, and one of the pillars was accordingly taken up; from which it appeared that the petrification had only advanced three fourths of an inch in the space of 1500 years. There are, however, certain waters in which this transmutation is more readily accomplished.—Petrifications appear to be formed more slowly in earths that are porous and in a slight degree moist than in water itself.

When the foundations of the city of Quebec in Canada were dug up, a petrified savage was found among the last beds to which they proceeded. Although there was no idea of the time at which this man had been buried under the ruins, it is however true, that his quiver and arrows were still well preserved. In digging a lead-mine in Derbyshire in 1744, a human skeleton was found among stags horns. It is impossible to say how many ages this carcase had lain there. In 1695 the entire skeleton of an elephant was dug up near Tonna in Thuringia. Some time before this epoch the petrified skeleton of a crocodile was found in the mines of that country. We might cite another fact equally curious which happened at the beginning of the last century. John Munte, curate of Slægarp in Scania, and several of his parishioners, wishing to procure turf from a drained marshy soil, found, some feet below ground, an entire cart with the skeletons of the horses and carter. It is presumed that there had formerly been a lake in that place, and that the carter attempting to pass over on the ice, had by that means probably perished. In fine, wood partly fossil and partly coaly has been found at a great depth, in the clay of which tile was made for the Abbey of Fontenay. It is but very lately that fossil wood was discovered at the depth of 75 feet in a well betwixt Issi and Vauvres near Paris. This wood was in sand betwixt a bed of clay and pyrites, and water was found four feet lower than the pyrites. M. de Laumont, inspector general of the mines, says (*Journal de Physique*, Mai 1736), that in the lead-mine at Pontpéan near Rennes, is a fissure, perhaps the only one of its kind. In that fissure, sea-

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shells;

Petrifac-
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shells, rounded pebbles, and an entire beech, have been found 240 feet deep. This beech was laid horizontally in the direction of the fissure. Its bark was converted into pyrites, the sap-wood into jet, and the centre into coal.

A great many pieces of petrified wood are found in different counties of France and Savoy. In Cobourg in Saxony, and in the mountains of Misnia, trees of a considerable thickness have been taken from the earth, which were entirely changed into a very fine agate, as also their branches and their roots. In sawing them, the annual circles of their growth have been distinguished. Pieces have been taken up, on which it was distinctly seen that they had been gnawed by worms; others bear visible marks of the hatchet. In fine, pieces have been found which were petrified at one end, while the other still remained in the state of wood fit for being burned. It appears then that petrified wood is a great deal less rare in nature than is commonly imagined.

Cronstedt has excluded petrifications from any place in the body of his system of mineralogy, but takes notice of them in his appendix. He distinguishes them by the name of *Mineralia Larvata*, and defines them to be "mineral bodies in the form of animals or vegetables." The most remarkable observations concerning them, according to Mr Kirwan, who differs in some particulars from Mongez, are as follow. 1. Those of shells are found on or near the surface of the earth; those of fish deeper; and those of wood deeper still. Shells in substance are found in vast quantities, and at considerable depths. 2. The substances most susceptible of petrification are those which most resist the putrefactive process; of which kind are shells, the harder kinds of wood, &c.; while the softer parts of animals, which easily putrefy, are seldom met with in a petrified state. 3. They are most commonly found in strata of marl, chalk, limestone, or clay: seldom in sandstone, still more seldom in gypsum; and never in gneiss, granite, basalt, or schist. Sometimes they are found in pyrites, and ores of iron, copper, and silver; consisting almost always of that kind of earth or other mineral which surrounds them; sometimes of flint, agate, or cornelian. 4. They are found in climates where the animals themselves could not have existed. 5. Those found in slate or clay are compressed and flattened.

The different species of petrifications, according to Cronstedt, are,

I. *Terra Larvata*; extraneous bodies changed into a limy substance or calcareous changes. These are, 1. Loose or friable. 2. Indurated. The former are of a chalky nature in form of vegetables or animals; the second filled with solid limestone in the same forms. Some are found entirely changed into a calcareous spar. All of them are found in France, Sweden, and other countries in great plenty.

On these petrifications Cronstedt observes, that shells and corals are composed of limy matter even when still inhabited by their animals, but they are classed among the petrifications as soon as the calcareous particles have obtained a new arrangement; for example, when they have become sparry; filled with calcareous earth either hardened or loose, or when they lie in the strata of the earth. "These, says he, form the greatest part of the fossil collections which are so industriously made, often

without any regard to the principal and only use they can be of, viz. that of enriching zoology. Mineralogists are satisfied with seeing the possibility of the changes the limestone undergoes in regard to its particles; and also with receiving some insight into the alteration which the earth has been subject to from the state of the strata which are now found in it." The calcined shells, where the petrifications are of a limy or chalky nature, answer extremely well as a manure; but the indurated kind serve only for making grottoes. Gypseous petrifications are extremely rare; however, Chardin informs us that he had seen a lizard inclosed in a stone of that kind in Persia.

II. *Larvæ*, or bodies changed into a stony substance. These are all indurated, and are of the following species. 1. Cornelians in form of shells from the river Tomm in Siberia. 2. Agate in form of wood; a piece of which is said to be in the collection of the Count de Tessin. 3. Coralloids of white flint (*Millepora*) found in Sweden. 4. Wood of yellow flint found in Italy, in Turkey near Adrianople, and produced by the waters of Lough-neagh in Ireland.

III. *Larvæ Argillaceæ*; where the bodies appear to be changed into clay. These are found either loose and friable, or indurated. Of the former kind is a piece of porcelain clay met with in a certain collection, with all the marks of the root of a tree upon it. Of the latter kind is the osteocolla; which is said to be the roots of the poplar-tree changed, and not to consist of any calcareous substance. A sort of fossil ivory, with all the properties of clay, is said likewise to be found in some places.

IV. *Larvæ Infusite*; where the substances are impregnated with great quantities of salts. Human bodies have been twice found impregnated with vitriol of iron in the mine of Falun, in the province of Dalarna in Sweden. One of them was kept for several years in a glass case, but at last began to moulder and fall to pieces. Turf and roots of trees are likewise found in water strongly impregnated with vitriol. They do not flame, but look like a coal in a strong fire; neither do they decay in the air.

V. Bodies penetrated by mineral inflammable substances. 1. By pit-coal, such as wood; whence some have imagined coal to have been originally produced from wood. Some of these substances are fully saturated with the coaly matter; others not. Among the former Cronstedt reckons jet; among the latter the substance called *mumia vegetabilis*, which is of a loose texture, resembling amber, and may be used as such. 2. Those penetrated by asphaltum or rock-oil. The only example of these given by our author is a kind of turf in the province of Skone in Sweden. The Egyptian mummies, he observes, cannot have any place among this species, as they are impregnated artificially with asphaltum, in a manner similar to what happens naturally with the wood and coaly matter in the last species. 3. Those impregnated with sulphur which has dissolved iron, or with pyrites. Human bodies, bivalve and univalve shells and insects, have been all found in this state; and the last are found in the alum state at Andrarum, in the province of Skone in Sweden.

VI. *Larvæ metalliferae*; where the bodies are impregnated with metals. These are, 1. Covered with native silver; which is found on the surface of shells

Petrifac-
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Fig. 1.



Fig. 6.



Pennatula. Fig. 4.



Fig. 8.



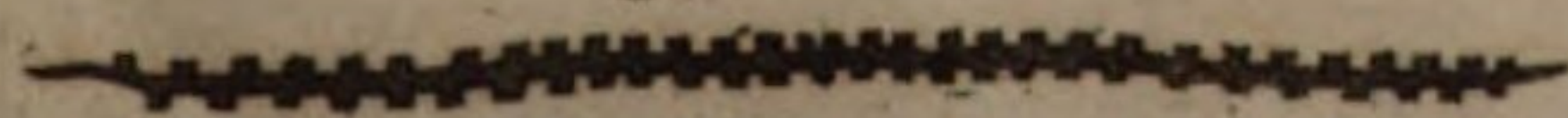
Fig. 3.



Fig. 5.



Fig. 7.



Petrified animal body.

Fig. 10.



Fig. 9.

Petrifac-
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in England. 2. Where the metal is mineralised with copper and sulphur. Of this kind is the fahlertz or grey silver ore, in the shape of ears of corn, and supposed to be vegetables, found in argillaceous slate at Frankenberg and Tahlitteren in Hesse. 3. *Larva cuprifera*, where the bodies are impregnated with copper. To this species principally belong the Turquoise or Turkey stones, improperly so called; being ivory and bones of the elephant or other animals impregnated with copper. See TURQUOISE. At Simore in Languedoc there are bones of animals dug up, which, during calcination, assume a blue colour; but according to Cronstedt it is not probable that these owe their colour to copper. 3. With mineralised copper. Of these our author gives two examples. One is where the copper is mineralised with sulphur and iron, forming a yellow marcasitical ore. With this some shells are impregnated which lie upon a bed of loadstone in Norway. Other petrifications of this kind are found in the form of fish in different parts of Germany. The other kind is where the copper is impregnated with sulphur and silver. Of this kind is the grey silver ore, like ears of corn, found in the slate quarries at Hesse. 4. *Larva ferrifera*, with iron in form of a calx, which has assumed the place or shape of extraneous bodies. These are either loose or indurated. Of the loose kind are some roots of trees found at the lake Langelma in Finland. The indurated kinds are exemplified in some wood found at Orbissan in Bohemia. 5. Where the iron is mineralised, as in the pyritaceous larvæ, already described.

VII. Where the bodies are tending to decomposition, or in a way of destruction. Among these, our author enumerates MOULD and TURF, which see; as also CEMENT, MORTAR, ROCK, SAND, SELENITÆ, STONE, and WATER. See likewise the article FOSSIL, Plates CC and CCI, and MOUNTAIN.

We shall add the following description of a very curious animal petrification. The Abbé de Sauvages, celebrated for his refined taste and knowledge in natural history, in a tour through Languedoc, between Alais and Uzes, met with a narrow vein of no more than two toises wide, which crosses the road, and is bordered on one side by a grey dirty soil, and on the other by a dry sandy earth, each of a vast extent, and on a level with the narrow vein which separates them. In this narrow vein only are contained petrified shells, cemented together by a whitish marl. They are in prodigious plenty; among which there is one species which the Abbé does not remember to have known to have been anywhere described, and may probably be a new acquisition to natural history.

This shell has the shape of a horn, somewhat incurvated towards the base. (See figure 9. Plate CCCLXXXVIII.) It seems composed of several cups, let into each other, which are sometimes found separate. They have all deep channels, which extend, as in many other shells, from the base to the aperture; the projecting ribs which form these channels are mostly worn away, being rarely to be found entire. Sometimes several are grouped together; and as a proof that they are not a fortuitous assemblage caused by the petrification, they are fixed together through their whole length, in such sort, that their base and aperture are regularly turned the same way. The Abbé should

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have referred this to the genus which Linnæus and the Marquis d'Argenville named *dentalis*, had they not been let into each other. He found some of them whose aperture or hollow was not stopped up by the petrification, and seemed as cones adapted to one another (fig. 10.), forming a row of narrow cells, separated by a very thin partition: this row occupied not more than one half of the cavity of the shell.

Our article has already extended to such a length as to preclude any further additions; we cannot, however, finish it without observing, that fossil bones are very common in Dalmatia. They are of various kinds, and in their nature, apparently very extraordinary; but we have found no tolerable account or probable conjecture of their origin. Vitaliano Donati of Padua, in his *Saggio sopra la storia naturale dell' Adriatico*, was the first who took notice of them; and Fortis, in his travels into Dalmatia, has given a copious account of them. They are most common in the islands of *Cherso* and *Osero*. See Fortis's Travels into Dalmatia, page 440—465, and our article VITALIANO.

PETRIFIED CITY. The story of a petrified city is well known all over Africa, and has been believed by many considerable persons even in Europe. Louis XIV. was so fully persuaded of its reality, that he ordered his ambassador to procure the body of a man petrified from it at any price. Dr Shaw's account of this affair is as follows: "About 40 years ago (now more than 70), when M. le Maire was the French consul at Tripoli, he made great inquiries, by order of the French court, into the truth of the report concerning a petrified city at Ras Sem; and amongst other very curious accounts relating to this place, he told me a remarkable circumstance, to the great discredit, and even confutation, of all that had been so positively advanced with regard to the petrified bodies of men, children, and other animals.

"Some of the janizaries, who, in collecting tribute, traverse the district of Ras Sem, promised him, that, as an adult person would be too cumbersome, they would undertake, for a certain number of dollars, to bring him from thence the body of a little child. After a great many pretended difficulties, delays, and disappointments, they produced at length a little Cupid, which they had found, as he learned afterwards, among the ruins of Leptis; and, to conceal the deceit, they broke off the quiver, and some other of the distinguishing characteristics of that deity. However, he paid them for it, according to promise, 1000 dollars, which is about 150 l. sterling of our money, as a reward for their faithful service and hazardous undertaking; having run the risk, as they pretended, of being strangled if they should have been discovered in thus delivering up to an infidel one of those unfortunate Mahometans, as they take them originally to have been.

"But notwithstanding this cheat and imposition had made the consul desist from searching after the petrified bodies of men and other animals; yet there was one matter of fact, as he told me, which still very strangely embarrassed him, and even strongly engaged him in favour of the current report and tradition. This was some little loaves of bread, as he called them, which had been brought to him from that place. His reasoning, indeed, thereupon, provided the pretended matter of fact had been clear and evident, was just and

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satisfactory; for where we find loaves of bread, these, as he urged, some persons must have been employed in making them, as well as others for whom they were prepared. One of these loaves he had, among other petrifications, very fortunately brought with him to Cairo, where I saw it, and found it to be an echinites of the discoid kind, of the same fashion with one I had lately found and brought with me from the deserts of Marah. We may therefore reasonably conclude, that there is nothing to be found at Ras Sem, unless it be the trunks of trees, echinites, and such petrifications as have been discovered at other places.

"M. le Maire's inquiries, which we find were supported by the promise and performance of great rewards, have brought nothing further to light. He could never learn that any traces of walls, or buildings, or animals, or utensils, were ever to be seen within the verge of these pretended petrifications. The like account I had from a Sicilian renegado, who was the janizary that attended me whilst I was in Egypt; and as in his earlier years he had been a soldier of Tripoli, he assured me that he had been several times at Ras Sem. This I had confirmed again in my return from the Levant by the interpreter of the British factory at Tunis, who was likewise a Sicilian renegado; and being the libertus or freedman of the bashaw of Tripoli, was preferred by him to be the bey or viceroy of the province of Darna, where Ras Sem was immediately under his jurisdiction. His account was likewise the same; neither had he ever seen, in his frequent journeys over this district, any other petrifications than what are above-mentioned. So that the petrified city, with its walls, castles, streets, shops, cattle, inhabitants, and utensils, were all of them at first the mere inventions of the Arabs, and afterwards propagated by such persons, who, like the Tripoli ambassador, and his friend above-mentioned, were credulous enough to believe them.

"However, there is one remarkable circumstance relating to Ras Sem that deserves well to be recorded. When the winds have blown away the billows of sand which frequently cover and conceal these petrifications, they discover, in some of the lower and more depressed places of this district, several little pools of water, which is usually of so ponderous a nature, that, upon drinking it, it passes through the body like quicksilver. This perhaps may be that petrifying fluid which has all along contributed to the conversion of the palm-trees and the echini into stone: for the formation not only of these, but of petrifications of all kinds, may be entirely owing to their having first of all lodged in a bed of loam, clay, sand, or some other proper nidus or matrix, and afterwards gradually been acted upon and pervaded by such a petrifying fluid as we may suppose this to be."

To this account it may not be amiss to subjoin the memorial of Cassim Aga, the Tripoli ambassador at the court of Britain. The city, he says, is situated two days journey south from Onguela, and 17 days journey from Tripoli by caravan to the south-east. "As one of my friends (says the ambassador) desired me to give him in writing an account of what I knew touching the petrified city, I told him what I had heard from different persons, and particularly from the

mouth of one man of credit who had been on the spot: that is to say, that it was a very spacious city, of a round form, having great and small streets therein, furnished with shops, with a vast castle magnificently built: that he had seen there several sorts of trees, the most part olives and palms, all of stone, and of a blue or rather lead colour: that he saw also figures of men in a posture of exercising their different employments; some holding in their hands staves, others bread, every one doing something, even women suckling their children, and in the embraces of their husbands, all of stone: that he went into the castle by three different gates, though there were many more, where he saw a man lying upon a bed of stone: that there were guards at the gates with pikes and javelins in their hands: in short, that he saw in this wonderful city many sorts of animals, as camels, oxen, horses, asses, sheep, and birds, all of stone, and the colour above-mentioned."

We have subjoined this account, because it shows in striking colours the amazing credulity of mankind, and the avidity with which they swallow the marvellous, and the difficulty of discovering the truth respecting places or things at a distance from us.

PETROBRUSSIANS, a religious sect, which had its rise in France and the Netherlands about the year 1110. The name is derived from *Peter Bruys*, a Provençal, who made the most laudable attempt to reform the abuses and remove the superstition that disgraced the beautiful simplicity of the gospel. His followers were numerous; and for 20 years his labour in the ministry was exemplary and unremitted. He was, however, burnt in the year 1130 by an enraged populace set on by the clergy.

The chief of Bruys's followers was a monk named *Henry*; from whom the Petrobrussians were also called *Henricians*. Peter the Venerable, abbot of Clugny, has an express treatise against the Petrobrussians; in the preface to which he reduces their opinions to five heads. 1. They denied that children before the age of reason can be justified by baptism, in regard it is our own faith that saves by baptism. 2. They held that no churches should be built, but that those that already are should be pulled down; an inn being as proper for prayers as a temple, and a stable as an altar. 3. That the cross ought to be pulled down and burnt, because we ought to abhor the instruments of our Saviour's passion. 4. That the real body and blood of Christ are not exhibited in the eucharist, but merely represented by their figures and symbols. 5. That sacrifices, alms, prayers, &c. do not avail the dead. F. Langlois objects Manicheism to the Petrobrussians; and says, they maintained two gods, the one good, the other evil: but this we rather esteem an effect of his zeal for the catholic cause, which determined him to blacken the adversaries thereof, than any real sentiment of the Petrobrussians.

PETROJOANNITES, were followers of Peter John, or Peter Joannis, i. e. Peter the son of John, who flourished in the 12th century. His doctrine was not known till after his death, when his body was taken out of his grave and burnt. His opinions were, that he alone had the knowledge of the true sense wherein the apostles preached the gospel; that the reasonable soul is not the form of man; that there is no grace infused

by

Petrobrus-
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Petroleum. by baptism; and that Jesus Christ was pierced with a lance on the cross before he expired.

* See *Che-
mistry*, n^o
1443.

PETROLEUM*, or **Rock oil**; a thick oily substance exuding out of the earth, and collected on the surface of wells in many parts of the world. It is found on some in Italy, and in a deserted mine in the province of Dalame in Sweden. In this last place it collects itself in small hollows of limestone, like resin in the wood of the pine-tree. It is found trickling from the rocks, or issuing from the earth, in many parts of the duchy of Modena, and in various parts of France, Switzerland, Germany, and Scotland, as well as in Asia. It is also found not only on the surface of wells as already mentioned, but mixed with earth and sand, from whence it may be separated by infusion in water. It is of a pungent and acrid taste, and smells like the oil of amber, but more agreeable. It is very light and very pellucid; but, though equally bright and clear under all circumstances, it is liable to a very great variety in its colour. It is naturally almost colourless, and in its appearance greatly resembles the most pure oil of turpentine: this is called *white petroleum*, though it has no more colour than water. It is sometimes tinged of a brownish, reddish, yellowish, or faint greenish colour; but its most frequent colour is a mixture of the reddish and blackish, in such a degree that it looks black when viewed behind the light, but purple when placed between the eye and a candle or window. It is rendered thinner by distillation with water, and leaves a resinous residuum; when distilled with a volatile alkali, the latter acquires the properties of succinated ammoniac, and contains the acid of amber. It is the most frequent of all the liquid bitumens, and is perhaps the most valuable of them all in medicine. It is to be chosen the purest, lightest, and most pellucid that can be had, such as is of the most penetrating smell and is most inflammable. Monet informs us that some kinds of it are of the density of nut-oil. It is insoluble in spirit of wine; which, though it be the great dissolvent of sulphur, has no effect upon petroleum, not even with ever so long a digestion. It will not take fire with the dephlegmated acid spirits; as oil of cloves and other of the vegetable essential oils do: and in distillation, either by *balneum marie* or in sand, it will neither yield phlegm nor acid spirit; but the oil itself rises in its own form, leaving in the retort only a little matter, thick as honey, and of a brownish colour.

The finer kinds resemble naphtha. Kirwan is of opinion that naphtha is converted into petroleum by a process similar to what takes place in essential oils when exposed to the atmosphere; in which case the oil absorbs not only the pure, but also the phlogisticated, part of the atmosphere; in consequence of which several alterations take place in them.

Mr Bouldoc made several experiments with the white petroleum of Modena; an account of which he gave to the Paris academy.

It easily took fire (A) on being brought near a candle, Petroleum. and that without immediately touching the flame; and when heated in any vessel it will attract the flame of a candle, though placed at a great height above the vessel; and the vapour it sends up taking fire, the flame will be communicated to the vessel of heated liquor, and the whole will be consumed. It burns in the water; and when mixed with any liquor swims on the surface of it, even of the highest rectified spirit of wine, which is $\frac{1}{4}$ th heavier than pure petroleum. It readily mixes with all the essential oils of vegetables, as oil of lavender, turpentine, and the rest, and seems very much of their nature: nor is this very strange, since the alliance between these bodies is probably nearer than is imagined, as the essential oils of vegetables may have been originally mineral ones, and drawn up out of the earth into the vessels of the plants.

The distinguishing characteristic of the petroleum is its thickness, resembling inspissated oil: when pure it is lighter than spirit of wine; but, though ever so well rectified, it becomes in time thick and black as before. Petroleum, when shaken, yields a few bubbles; but they sooner subside than in almost any other liquor, and the liquor resumes its clear state again almost immediately. This seems owing to the air in this fluid being very equally distributed to all its parts, and the liquor being composed of particles very evenly and nicely arranged. This extensibility of the oil is also amazing. A drop of it will spread over several feet of water, and in this condition it gives a great variety of colours; that is, the several parts of which this thin film is composed act as so many prisms. The most severe frost never congeals petroleum into ice; and paper wetted with it becomes transparent as when wetted with oil; but it does not continue so, the paper becoming opaque again in a few minutes as the oil dries away.

There are three varieties of it according to Mongez. 1. The yellow, found at Modena in Italy; very light and volatile. 2. The reddish, or yellowish red; some of which is collected at Gabian in Languedoc and in Alsace. 3. The heavy, black, or brown kind, which is the most common, and met with in England, France, Germany, and some other countries. It generally runs out either from chinks or gaps of rocks, or is mixed with the earth, and gushes out of it; or it swims on the water of some fountains, as already mentioned. According to Dr Lippert, a kind of rosin is produced by mixing petroleum with smoking nitrous acid. The taste of this substance is very bitter, but the smell resembles that of musk. The vitriolic acid, according to the same author, produces a resin still more bitter, but without any aromatic smell. Cronstedt enumerates the following species.

I. *Maltha*, or Barbadoes tar, a thick substance resembling soft pitch. It is found in several parts of Europe and Asia; particularly Sweden, Germany, and Switzerland; on the coast of the Dead Sea in

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Palestine;

(A) Alonso Barba, in his book of metals, gives a very melancholy instance of the power of petroleum of taking fire at a distance. He tells us, that a certain well, yielding petroleum on the surface of its water, being to be repaired, the workman took down into the well with him a lantern and a candle in it: there were some holes in the lantern, through which the petroleum at a considerable distance sucked out the flame of the candle, and, taking fire, burst up with the noise of a cannon, and tore the man to pieces.

Petroleum Palestine; in Persia, in the chinks of rocks, and in strata of gypsum and limestone, or floating upon water. It is found also in America, and at Colebrookdale in England. Kirwan tells us, that petroleum exposed for a long time to the air forms this substance. It is of a viscid consistence; and of a brown, black, or reddish black colour. Sometimes it is inodorous, but generally of a more or less disagreeable smell, particularly when burned. It melts easily, and burns with much smoke and soot, leaving either ashes or a slag according to the heterogeneous matter it contains. It contains a portion of the acid of amber. It gives a bitter salt with mineral alkali, more difficult of solution than common salt, and which, when treated with charcoal, does not yield any sulphur.

II. *Elastic Petrol*; a very singular kind of fossil met with in some parts of England. This, in colour and consistency, exactly resembles the *CAOUTCHOUC*, or elastic gum-resin, commonly called *Indian rubber*, found in South America, and used for rubbing out the traces of black lead pencils from paper. It is of a dark brown colour, almost black; and in some pieces has a yellowish-brown cast like the same gum-resin. It can scarce be distinguished from the caoutchouc with regard to its elastic property, excepting that the cohesion of its parts is not so great. It burns with a smoky flame, and melts likewise into a thick oily fluid; but emits a disagreeable smell like the *Fossil*

Pitch or Barbadoes tar. "On the whole (says M. Petroleus, Magellan), this fossil seems to confirm the opinion of those mineralogists who believe that these oily combustibles derive their origin from the vegetable kingdom. It seems worth trying whether pieces of asphaltum, buried in damp beds of sparry rubbish or other kinds of earth, would take the same elastic consistence." This substance was found in the year 1785 near Casselton in Derbyshire, but in very small quantities. Some of the specimens were of a cylindrical form, like bits of small branches or stalks of vegetables; tho' much more flexible, being perfectly elastic.

III. *Hardened rock-oil*, or fossil pitch, an inflammable substance dug out of the ground in many parts of the world, and known by the names of *petroleum induratum*, *pix montana*, *indenpech*, *berghartz*, &c. There are two species. 1. The asphaltum (B), or pure fossil pitch, found on the shores of the Dead Sea and of the Red Sea; also in Sweden, Germany, and France: See ASPHALTUM. It is a smooth, hard, brittle, inodorous substance, of a black or brown colour when looked at; but on holding it up betwixt the eye and the light, appears of a deep red. It swims in water; breaks with a smooth and shining surface; melts easily; and, when pure, burns without leaving any ashes; but, if impure, leaves ashes, or a slag. M. Monet asserts that it contains sulphur, or at least the vitriolic acid. It is slightly and partially acted upon by spirit-of-wine and

(B) This species is found in great quantity in a bituminous lake or plain in the island of Trinidad, of which Mr Anderson gives the following copious account in the 79th volume of the Philosophical Transactions.

"A most remarkable production of nature in the island of Trinidad, is a bituminous lake, or rather plain, known by the name of *Tar Lake*; by the French called *La Bray*, from the resemblance to, and answering the intention of, ship-pitch. It lies in the leeward side of the island, about half-way from the Bocas to the south end, where the mangrove swamps are interrupted by the sand-banks and hills; and on a point of land which extends into the sea about two miles, exactly opposite to the high mountains of Paria, on the north side of the gulf.

"This cape, or headland, is about 50 feet above the level of the sea, and is the greatest elevation of land on this side of the island. From the sea it appears a mass of black vitrified rocks; but, on a close examination, it is found a composition of bituminous scorix, vitrified sand, and earth, cemented together: in some parts beds of cinders only are found. In approaching this cape, there is a strong sulphureous smell, sometimes disagreeable. This smell is prevalent in many parts of the ground to the distance of eight or ten miles from it.

This point of land is about two miles broad, and on the east and west sides, from the distance of about half a mile from the sea, falls with a gentle declivity to it, and is joined to the main land on the south by the continuation of the mangrove swamps; so that the bituminous plain is on the highest part of it, and only separated from the sea by a margin of wood which surrounds it, and prevents a distant prospect of it. Its situation is similar to a savannah, and like them, it is not seen till treading upon its verge. Its colour and even surface present at first the aspect of a lake of water; but it is possible it got the appellation of *Lake* when seen in the hot and dry weather, at which time its surface to the depth of an inch is liquid; and then from its cohesive quality it cannot be walked upon.

"It is of a circular form, about three miles in circumference. At my first approach it appeared a plain, as smooth as glass, excepting some small clumps of shrubs and dwarf trees that had taken possession of some spots of it; but when I had proceeded some yards on it, I found it divided into areolæ of different sizes and shapes: the chasms or divisions anastomosed through every part of it; the surface of the areolæ perfectly horizontal and smooth; the margins undulated, each undulation enlarged to the bottom till they join the opposite. On the surface, the margin or first undulation is distant from the opposite from four to six feet, and the same depth before they coalesce; but where the angles of the areolæ oppose, the chasms or ramifications are wider and deeper. When I was at it, all these chasms were full of water, the whole forming one true horizontal plane, which rendered my investigation of it difficult and tedious, being necessitated to plunge into the water a great depth in passing from one areolæ to another. The truest idea that can be formed of its surface will be from the areolæ and their ramifications on the back of a turtle. Its more common consistence and appearance is that of pit-coal, the colour rather greyer. It breaks into small fragments of

Petroleum. and ether. Besides the countries above-mentioned, Brunnich informs us that the asphaltum comes from Porto Principe in the island of Cuba in the West Indies. It is likewise found, according to Fourcroy, in many parts of China; and is used for a covering to ships by Arabs and Indians. 2. The *pix montana impura* contains a great quantity of earthy matter, which is left in the retort after distillation, or upon the charcoal if burnt in the open fire. It coheres like a slag, and is of the colour of black-lead; but in a strong heat this earth is soon volatilised, so that its nature is not yet well known. During the distillation a liquid substance falls into the receiver, which is found to be

of the same nature with rock-oil. The substance itself is found in Sweden and several other countries. The *pisasphaltum* is of a mean consistence between the asphaltum and the common petroleum. Mongez says that it is the same with the bitumen collected from a well named *De la Pege*, near Clermont Ferrand in France.

The people of mount Ciaro, in Italy, have some years since found out a much easier way of finding petroleum than that which they formerly had been used to. This mountain abounds with a sort of greyish salt, which lies in large horizontal beds, mingled with strata of clay, and large quantities of a spar of that kind called

a cellular appearance, and glossy, with a number of minute and shining particles interspersed through its substance; it is very friable, and, when liquid, is of a jet black colour. Some parts of the surface are covered with a thin and brittle scoria, a little elevated.

“As to its depth, I can form no idea of it; for in no part could I find a substratum of any other substance: in some parts I found calcined earth mixed with it.

“Although I smelt sulphur very strong on passing over many parts of it, I could discover no appearance of it, or any rent or crack through which the steams might issue; probably it was from some parts of the adjacent woods: for although sulphur is the basis of this bituminous matter, yet the smells are very different, and easily distinguished, for its smell comes the nearest to that of pitch of any thing I know. I could make no impression on its surface without an axe: at the depth of a foot I found it a little softer, with an oily appearance, in small cells. A little of it held to a burning candle makes a hissing or crackling noise like nitre, emitting small sparks with a vivid flame, which extinguish the moment the candle is removed. A piece put in the fire will boil up a long time without suffering much diminution: after a long time's severe heat, the surface will burn and form a thin scoria, under which the rest remains liquid. Heat seems not to render it fluid, or occupy a larger space than when cold; from which, I imagine, there is but little alteration on it during the dry months, as the solar rays cannot exert their force above an inch below the surface. I was told by one Frenchman, that in the dry season the whole was an uniform smooth mass; and by another, that the ravins contained water fit for use during the year. But neither can I believe: for if, according to the first assertion, it was an homogeneous mass, something more than an external cause must affect it to give it the present appearances; nor without some hidden cause can the second be granted. Although the bottoms of these ramified channels admit not of absorption, yet from their open exposure, and the black surface of the circumjacent parts, evaporation must go on amazingly quick, and a short time of dry weather must soon empty them; nor from the situation and structure of the place is there a possibility of supply but from the clouds. To show that the progress of evaporation is inconceivably quick here, at the time I visited it there were, on an average, two-thirds of the time incessant torrents of rains; but from the afternoon being dry, with a gentle breeze (as is generally the case during the rainy season in this island), there evidently was an equilibrium between the rain and the evaporation; for in the course of three days I saw it twice, and perceived no alteration on the height of the water, nor any outlet for it but by evaporation.

“I take this bituminous substance to be the *bitumen asphaltum Linnæi*. A gentle heat renders it ductile; hence, mixed with a little grease or common pitch, it is much used for the bottoms of ships, and for which intention it is collected by many; and I should conceive it a preservative against the borer, so destructive to ships in this part of the world.

“Besides this place, where it is found in this solid state, it is found liquid in many parts of the woods; and at the distance of 20 miles from this about two inches thick in round holes of three or four inches diameter, and often at cracks or rents. This is consequently liquid, and smells stronger of tar than when indurated, and adheres strongly to any thing it touches; grease is the only thing that will divest the hands of it.

“The soil in general, for some distance round La Bray, is cinders and burnt earths; and where not so, it is a strong argillaceous soil; the whole exceedingly fertile, which is always the case where there are any sulphureous particles in it. Every part of the country, to the distance of 30 miles round, has every appearance of being formed by convulsions of nature from subterraneous fires. In several parts of the woods are hot springs; some I tried, with a well graduated thermometer of Fahrenheit, were 20° and 22° hotter than the atmosphere at the time of trial. From its position to them, this part of the island has certainly experienced the effects of the volcanic eruptions, which have heaped up those prodigious masses of mountains that terminate the province of Paria on the north; and no doubt there has been, and still probably is, a communication between them. One of these mountains opposite to La Bray in Trinidad, about 30 miles distant, has every appearance of a volcanic mountain: however, the volcanic efforts have been very weak here, as no traces of them extend above two miles from the sea in this part of the island, and the greater part,

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called by the Germans *selenites*; which is the common sort, that ferments with acids, and readily dissolves in them, and calcines in a small fire. They pierce these slates in a perpendicular direction till they find water; and the petroleum which had been dispersed among the cracks of those slates is then washed out by the water, and brought from all the neighbouring places to the hole or well which they have dug, on the surface of the water of which it swims after eight or ten days. When there is enough of it got together, they lade it from the top of the water with brass basons; and it is then easily separated from what little water is taken up with it. These wells or holes continue to furnish the oil in different quantities for a considerable time; and when they will yield no more, they pierce the slates in some other place.

It is never used among us as a medicine; but the French give it internally in hysteric complaints, and to their children for worms: some also give it from 10 to 15 drops in wine for suppressions of the menses. This, however, is rather the practice of the common people than of the faculty.

PETROMYZON, the LAMPREY, a genus of fishes belonging to the class of amphibia nantes. It has seven spiracula at the side of the neck, no gills, a fistula on the top of the head, and no breast or belly fins. There are three species, distinguished by peculiarities in their back fins.

1. The marinus, or sea-lamprey, is sometimes found so large as to weigh four or five pounds. It greatly resembles the eel in shape; but its body is larger, and its snout longer, narrower, and sharper, at the termination. The opening of the throat is very wide; each jaw is furnished with a single row of very small teeth; in the middle of the palate are situated one or two other teeth, which are longer, stronger, and moveable towards the inside of the throat; the inferior part of the palate presents moreover a row of very small teeth, which reaches to the bottom of the throat, where we find four long notched bones; two short fistulous pro-

cesses are observable at the extremity of the snout, and there are two others thicker but still shorter above the eyes. Willoughby supposes that the latter are the organ of hearing, and the former the organ of smell. His opinion with regard to the auditory faculty of this fish is founded on what we read in ancient authors, that the fishermen attracted the lampreys by whistling, and that Crassus had tamed one of them to such a degree that it knew his voice and obeyed his call.

The eyes of the lamprey are small, and covered with a transparent light blue membrane; the pupil is bordered with a circle of a colour resembling gold; near the gills, which are four in number, there is a round hole on both sides, through which it discharges the water. The lamprey has no fins on his belly or breast; on the back we observe a fin, which begins pretty near the head, extends to the tail which it turns round, and is afterwards continued to the anus: this fin is covered by the skin of the body, to which it adheres but loosely; the skin is smooth, of a red blackish colour, and streaked with yellow; the lamprey advances in the water with winding motions like those of a serpent, which is common to it, with all the anguilliform fishes.

The lamprey lives on flesh. During the cold it lies concealed in the crevices of sea-rocks, and consequently is fished for only at certain seasons. It lives in a state of hostility with the poulpe, a kind of sea polypus, which shuns the combat as long as it can; but when it finds the impossibility of escape, it endeavours to surround the lamprey with its long arms. The latter slips away, and the poulpe becomes its prey. The lobster, we are told, avenges the poulpe, and destroys the lamprey in its turn. See CANCER.

Rondelet says, that the fishermen consider the bite of the lamprey as venomous and dangerous, and never touch it while alive but with pincers. They beat it on the jaws with a stick, and cut off its head. The same naturalist observes, that its ashes are a cure for its bite and for the king's evil. When any one has been

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part of it has had its origin from a very different cause to that of volcanoes; but they have certainly laid the foundation of it, as is evident from the high ridge of mountains which surrounds its windward side to protect it from the depredations of the ocean, and is its only barrier against that overpowering element, and may properly be called the skeleton of the island.

"From every examination I have made, I find the whole island formed of an argillaceous earth, either in its primitive state or under its different metamorphoses. The bases of the mountains are composed of *schistus argillaceus* and *talcum lithomargo*; but the plains or lowlands remaining nearly in the same moist state as at its formation, the component particles have not experienced the vicissitudes of nature so much as the more elevated parts, consequently retain more of their primitive forms and properties. As argillaceous earth is formed from the sediment of the ocean, from the situation of Trinidad to the continent its formation is easily accounted for, granting first the formation of the ridge of mountains that bound its windward side, and the high mountains on the continent that nearly join it: for the great influx of currents into the gulf of Paria from the coasts of Brazil and Andalusia must bring a vast quantity of light earthy particles from the mouth of the numerous large rivers which traverse these parts of the continent: but the currents being repelled by these ridges of mountains, eddies and smooth water will be produced where they meet and oppose; and therefore the earthy particles would subside, and form banks of mud, and by fresh accumulations added, would soon form dry land: and from these causes it is evident such a tract of country as Trinidad must be formed. But these causes still exist, and the effect from them is evident; for the island is daily growing on the leeward side, as may be seen from the mud-beds that extend a great way into the gulf, and there constantly increase. But from the great influx from the ocean at the south end of the island, and its egress to the Atlantic again, through the Bocas, a channel must ever exist between the continent and Trinidad." See TRINIDAD.

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been bit by a lamprey, the most effectual method is to cut out the part affected. Lampreys are very dexterous in saving themselves: when taken with a hook, they cut the line with their teeth; and when they perceive themselves caught in a net, they attempt to pass through the meshes. They fish for lampreys only on the pebbly edges of sea-rocks; some of these pebbles are drawn together to make a pit as far as the water-edge, or perhaps a little blood is thrown in, and the lamprey is immediately observed to put forth its head between two rocks. As soon as the hook, which is baited with crab or some other fish, is presented to it, it swallows it greedily, and drags it into its hole. There is then occasion for great dexterity to pull it out suddenly; for if it is allowed time to attach itself by the tail, the jaw would be torn away before the fish could be taken. This shows that its strength resides in the end of its tail; the reason of which is, that the great bone of this fish is reversed, so that the bones, which in all other fishes are bent towards the tail, are here turned in a contrary direction, and ascend towards the head. After the lamprey is taken out of the water, it is not killed without a great deal of trouble: the best way is to cut the end of its tail, or perhaps to crush it with repeated blows on the spine, in order to prevent it from leaping. This shows, that in the lamprey animal life extends to the end of the spinal marrow.

M. de Querhoent removes our fears concerning the supposed poison of the lamprey. This species of fish, he tells us, abounds on the coasts of Africa and at the Antilles isles; it is found likewise on the coast of Brazil, at Surinam, and in the East Indies. When taken with a hook, we must have the precaution to kill it before we take it off, otherwise it darts upon the fisher and wounds him severely. Its wounds, however, are not venomous, M. de Querhoent having seen several sailors who were bit by it, but experienced no disagreeable consequences. Lampreys are likewise found in great abundance at Ascension Island, but particularly in the seas of Italy: their flesh when dried is excellent; and boiling gives to the vertebræ the colour of gridelin.

The flesh of the lamprey is white, fat, soft, and tender; it is pretty agreeable to the taste, and almost as nourishing as that of the eel; those of a large size are greatly superior to the small ones. We know that the most wealthy of the Romans kept them in fish-ponds at a great expence. Vedius Pollio, the friend of Augustus, who is distinguished in history for his savage gluttony, on supposition that lampreys fed on human flesh were more delicate, ordered his slaves when accused of the slightest faults to be thrown into his fish-ponds. We are no less surprised, in reading the ancient authors, to perceive the extraordinary attachment which the celebrated orators Hortensius and Crassus, men in other respects so grave and sensible, had to this animal. One of them shed tears at the loss of a lamprey; the other improved upon this puerility, and wore mourning at the death of his favourite. It is remarkable, that this fish, which is proper to the sea, and never comes into the rivers, can live and fatten in fresh water. For the advancement of natural history, it were to be wished, that some person who lives near the sea-shore would make observations, in order to discover whether the

lamprey is viviparous: its scales are so imperceptible, that they have been overlooked by most ichthyologists.

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Mr Pennant is of opinion, that the ancients were unacquainted with this fish; at least, he says, it is certain, that which Dr Arbuthnot and other learned men render the word *lamprey*, is a species unknown in our seas, being the *muræna* of Ovid, Pliny, and others, for which we want an English name. This fish, the *lupus* (our baffle), and the *myxo* (a species of mullet), formed that pride of Roman banquets the *tripatinam*, so called, according to Arbuthnot, from their being served up in a machine with three bottoms. The words *lampetra* and *petromyzon* are but of modern date, invented from the nature of the fish; the first a *lambendo petras*, the other from *πετρος* and *μυζω*, because they are supposed to lick or suck the rocks.

2. The fluviatilis, or lesser lamprey, sometimes grows to the length of 10 inches. The mouth is formed like that of the preceding. On the upper part is a large bifurcated tooth: on each side are three rows of very minute ones: on the lower part are seven teeth, the exterior of which on one side is the largest. The irides are yellow. As in all the other species, between the eyes on the top of the head is a small orifice, of great use to clear its mouth of the water that remains on adhering to the stones; for through that orifice it ejects the water in the same manner as cetaceous fish. On the lower part of the back is a narrow fin, beneath that rises another, which at the beginning is high and angular, then grows narrow, surrounds the tail, and ends near the anus. The colour of the back is brown or dusky, and sometimes mixed with blue; the whole under-side silvery. These are found in the Thames, Severn, and Dee; are potted with the larger kind; and are by some preferred to it, as being milder tasted. Vast quantities are taken about Mortlake, and sold to the Dutch for bait for their cod-fishery. Above 430,000 have been sold in a season at 40 s. per 1000; and of late, about 100,000 have been sent to Harwich for the same purpose. It is said that the Dutch have the secret of preserving them till the turbot fishery.

3. The bronchialis, or lampern, is sometimes found of the length of eight inches, and about the thickness of a swan's quill; but they are generally much smaller. The body is marked with numbers of transverse lines, that pass cross the sides from the back to the bottom of the belly, which is divided from the mouth to the anus by a straight line. The back fin is not angular like that of the former, but of an equal breadth. The tail is lanceolated, and short at the end. They are frequent in the rivers near Oxford, particularly the Isis; but not peculiar to that county, being found in others of the English rivers, where, instead of concealing themselves under the stones, they lodge themselves in the mud, and never are observed to adhere to any thing like other lampreys.

PETRONIUS was a renowned Roman senator. When governor of Egypt, he permitted Herod, king of the Jews, to purchase in Alexandria any quantity of corn which he should judge necessary for the supply of his subjects, who were afflicted with a severe famine. When Tiberius died, Caius Caligula, who succeeded him, took from Vitellius the government of Syria, and gave it

Petronius, it to Petronius, who discharged the duties of his office with dignity and honour. From his inclination to favour the Jews, he run the risk of losing the emperor's friendship and his own life; for when that prince gave orders to have his statue deposited in the temple of Jerusalem, Petronius, finding that the Jews would rather suffer death than see that sacred place profaned, was unwilling to have recourse to violent measures; and therefore preferred a moderation, dictated by humanity, to a cruel obedience. (We must not confound him with another of the same name, viz. Petronius Granius, who was a centurion in the eighth legion, and served under Cæsar in the Gallic war). In his voyage to Africa, of which country he had been appointed quæstor, the ship in which he sailed was taken by Scipio, who caused all the soldiers to be put to the sword, and promised to save the quæstor's life, provided that he would renounce Cæsar's party. To this proposal Petronius replied, that "Cæsar's officers were accustomed to grant life to others, and not to receive it;" and, at the same time, he stabbed himself with his own sword.

PETRONIUS Arbiter (Titus), a great critic and polite writer of antiquity, the favourite of Nero, supposed to be the same mentioned by Tacitus in the 16th book of his Annals. He was proconsul of Bithynia, and afterwards consul, and appeared capable of the greatest employments. He was one of Nero's principal confidants, and in a manner the superintendant of his pleasures; for that prince thought nothing agreeable or delightful but what was approved by Petronius. The great favour shown him drew upon him the envy of Tigellinus, another of Nero's favourites, who accused him of being concerned in a conspiracy against the emperor; on which Petronius was seized, and was sentenced to die. He met death with a striking indifference, and seems to have tasted it nearly as he had done his pleasures. He would sometimes open a vein and sometimes close it, conversing with his friends in the meanwhile, not on the immortality of the soul, which was no part of his creed, but on topics which pleased his fancy, as of love-verses, agreeable and passionate airs; so that it has been said "his dying was barely ceasing to live." Of this disciple of Epicurus, Tacitus gives the following character: "He was (says he) neither a spendthrift nor a debauchee, like the generality of those who ruin themselves; but a refined voluptuary, who devoted the day to sleep, and the night to the duties of his office, and to pleasure." This courtier is much distinguished by a satire which he wrote, and secretly conveyed to Nero; in which he ingeniously describes, under borrowed names, the character of this prince. Voltaire is of opinion that we have no more of this performance but an extract made by some obscure libertine, without either taste or judgment. Peter Petit discovered at Traw in Dalmatia, in 1665, a considerable fragment, containing the sequel of Trimalcion's Feast. This fragment, which was printed the year after at Padua and at Paris, produced a paper war among the learned. While some affirmed that it was the work of Petronius, and others denied it to be so, Petit continued to assert his right to the discovery of the manuscript, and sent it to Rome, where it was acknowledged to be a production of the 15th century. The French critics, who had attacked its authenticity,

were silent from the moment it was deposited in the royal library. It is now generally attributed to Petronius, and found in every subsequent edition of the works of that refined voluptuary. The public did not form the same favourable opinion of some other fragments, which were extracted from a manuscript found at Belgrade in 1688, and printed at Paris by Nodot in 1694, tho' they are ascribed by the editor Charpentier, and several other learned men, to Petronius; yet, on account of the Gallicisms and other barbarous expressions with which they abound, they have generally been considered as unworthy of that author. His genuine works are, 1. A Poem on the civil war between Cæsar and Pompey, translated into prose by Abbé de Marolles, and into French verse by President Bouhier, 1737, in 4to. Petronius, full of fire and enthusiasm, and disgusted with Lucan's flowery language, opposed Pharsalia to Pharsalia; but his work, though evidently superior to the other in some respects, is by no means in the true style of epic poetry. 2. A Poem on the Education of the Roman Youth. 3. Two Treatises; one upon the Corruption of Eloquence, and the other on the Causes of the Decay of Arts and Sciences. 4. A Poem on the Vanity of Dreams. 5. The Shipwreck of Licas. 6. Reflections on the Inconstancy of Human Life. And, 7. Trimalcion's Banquet. To this last performance morality is not much indebted. It is a description of the pleasures of a corrupted court; and the painter is rather an ingenious courtier than a person whose aim is to reform abuses. The best editions of Petronius are those published at Venice, 1499, in 4to; at Amsterdam, 1669, in 8vo, *cum notis variorum*; Ibid. with Boschius's notes, 1677, in 24to; and 1700, 2 vols in 24to. The edition of *variorum* was reprinted in 1743, in 2 vols 4to, with the learned Peter Burman's commentaries. Petronius died in the year 65 or 66.

PETRONIUS (Maximus) was born in the year 395 of an illustrious family, being at first a senator and consul of Rome. He put on the imperial purple in 455, after having effected the assassination of Valentinian III. In order to establish himself upon the throne, he married Eudoxia the widow of that unfortunate prince; and, as she was ignorant of his villany, he confessed to her, in a transport of love, that the strong desire he had of being her husband, had made him commit this atrocious crime. Whereupon Eudoxia privately applied to Genseric, king of the Vandals, who coming into Italy with a very powerful army, entered Rome, where the usurper then was. The unhappy wretch endeavoured to make his escape; but the soldiers and people, enraged at his cowardice, fell upon him, and overwhelmed him with a shower of stones. His body was dragged through the streets of the city for three days; and, after treating it with every mark of disgrace, they threw it into the Tiber the 12th of June the same year, 455. He reigned only 77 days. He had some good qualities. He loved and cultivated the sciences. He was prudent in his councils, circumspect in his actions, equitable in his judgments; a facetious companion, and steady friend. He had the good fortune to win the affections of every body, while he remained a private character; but as a prince, he was so much the more detestable, in that, after he had obtained the throne by villany, he kept possession of it only by violence.

Phalena.

Plate CCCLXXXIX.

N^o 1.



N^o 2.



N^o 3.



N^o 5.



N^o 4.



Phaeton or Tropic Bird.



Persepolis.



A. Bell Pin. W. & A. sculptor fecit.

Petrosa
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Petty.

The crown was scarcely on his head before it appeared to him an insupportable burden. "Happy Democles (exclaimed he in his despair), thou wert a king during a single entertainment!"

PETROSA ossa, in anatomy, a name given to the fourth and fifth bones of the cranium, called also *ossa temporum* and *ossa squamosa*; the substance whereof, as their first and last names express, is squamose and very hard.

PETROSELINUM (APIUM PETROSELINUM, Lin.) Parsley. This plant is commonly cultivated for culinary purposes. The seeds have an aromatic flavour, and are occasionally used as carminatives, &c. The root of parsley is one of the five aperient roots, and with this intention is sometimes made an ingredient in apozems and diet-drinks: if liberally used, it is apt to occasion flatulencies; and thus, by distending the viscera, produces a contrary effect to that intended by it: the taste of this root is somewhat sweetish, with a light degree of warmth and aromatic flavour.

PETTEIA, in the ancient music, a term to which we have no one corresponding in our language.

The melopœia, or the art of arranging sounds in succession so as to make melody, is divided into three parts, which the Greeks call *lepsis*, *mixis*, and *chresis*; the Latins *sumptio*, *mixtio*, and *usus*; and the Italians *presa*, *mescolamento*, and *uso*. The last of these is called by the Greeks *πετεια*, and by the Italians *pettia*; which therefore means the art of making a just discernment of all the manners of ranging or combining sounds among themselves, so as they may produce their effect, i. e. may express the several passions intended to be raised. Thus it shows what sounds are to be used, and what not; how often they are severally to be repeated; with which to begin, and with which to end; whether with a grave sound to rise, or an acute one to fall, &c. The petteia constitutes the manners of the music; chooses out this or that passion, this or that motion of the soul, to be awakened; and determines whether it be proper to excite it on this or that occasion. The petteia, therefore, is in music much what the manners are in poetry.

It is not easy to discover whence the denomination should have been taken by the Greeks, unless from *πετεια*, their game of chess; the musical petteia being a sort of combination and arrangement of sounds, as chess is of pieces called *πετεια*, *calculi*, or "chess-men."

PETTY (Sir William), son of Anthony Petty a clothier, was born at Rumsey, a little haven-town in Hampshire, in 1623; and while a boy took great delight in spending his time among the artificers there, whose trades he could work at when but twelve years of age. Then he went to the grammar-school there: at 15 he was master of the Latin, Greek, and French tongues, and of arithmetic and those parts of practical geometry and astronomy useful to navigation. Soon after he went to Caen in Normandy, and Paris, where he studied anatomy, and read Vesalius with Mr Hobbes. Upon his return to England, he was preferred in the king's navy. In 1643, when the war

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between the king and parliament grew hot, he went into the Netherlands and France for three years; and having vigorously prosecuted his studies, especially in physic, at Utrecht, Leyden, Amsterdam, and Paris, he returned home to Rumsey. In 1647, he obtained a patent to teach the art of double writing for seventeen years. In 1648, he published at London "Advice to Mr Samuel Hartlib, for the advancement of some particular parts of learning." At this time he adhered to the prevailing party of the kingdom; and went to Oxford, where he taught anatomy and chemistry, and was created a doctor of physic. In 1650, he was made professor of anatomy there; and soon after a member of the college of physicians in London. The same year he became physician to the army in Ireland; where he continued till 1659, and acquired a great fortune. After the restoration, he was introduced to king Charles II. who knighted him in 1661. In 1662, he published "A Treatise of taxes and contributions." Next year he was greatly applauded in Ireland for his invention of a double-bottomed ship. He died at London of a gangrene in the foot, occasioned by the swelling of the gout, in 1687.

The character of his genius is sufficiently seen in his writings, which were much more numerous than those we have mentioned above. Amongst these, it is said, he wrote the history of his own life, which unquestionably contained a full account of his political and religious principles, as may be conjectured from what he has left us upon those subjects in his will. In that he has these remarkable words: "As for legacies to the poor, I am at a stand; and for beggars by trade and election, I give them nothing: as for impotents by the hand of God, the public ought to maintain them: as for those who can get no work, the magistrates should cause them to be employed; which may be well done in Ireland, where are fifteen acres of improveable land for every head: as for prisoners for crimes by the king, or for debt by their prosecutors, those who compassionate the sufferings of any object, let them relieve themselves by relieving such sufferers; that is, give them alms (A), &c. I am contented, that I have assisted all my poor relations, and put many into a way of getting their own bread, and have laboured in public works and inventions, and have sought out real objects of charity; and do hereby conjure all who partake of my estate, from time to time to do the same at their peril. Nevertheless, to answer custom, and to take the sure side, I give twenty pounds to the most wanting of the parish wherein I die." As for his religion, he says, "I die in the profession of that faith, and in the practice of such worship, as I find established by the laws of my country; not being able to believe what I myself please, nor to worship God better than by doing as I would be done unto, and observing the laws of my country, and expressing my love and honour to Almighty God, by such signs and tokens as are understood to be such by the people with whom I live." He died possessed of a very large fortune, as appears by his will; where he makes his real estate

K k

about

(A) In the town of Rumsey there is a house which was given by him for the maintenance of a charity-school: the rent of which is still applied to that use.

Petty
||
Peucedanum.

about 6500 l. *per annum*, his personal estate about 45,000 l. his bad and desperate debts 30,000 l. and the demonstrable improvements of his Irish estate, 4000 l. *per annum*; in all, at six *per cent.* interest, 15,000 l. *per annum*. This estate came to his family, who were afterwards ennobled.

The variety of pursuits in which Sir William Petty was engaged, shows him to have had a genius capable of any thing to which he chose to apply it; and it is very extraordinary, that a man of so active and busy a spirit could find time to write so many things as it appears he did.

PETTY, any thing little or diminutive, when compared with another.

PETTY-Bag, an office in chancery; the three clerks of which record the return of all inquisitions out of every county, and make all patents of comptrollers, gaugers, customers, &c.

PETTY-Chaps, in ornithology. See MOTACILLA.

PETTY-Fogger, a little tricking solicitor or attorney, without either skill or conscience.

PETTY, or Petit, Larceny. See LARCENY.

PETTY-Pies, among confectioners, a sort of small pies, made of a rich crust filled with sweet meats.

PETTY-Singles, among falconers, are the toes of a hawk.

PETTY Tally, in the sea language, a competent allowance of victuals, according to the number of the ship's company.

PETTY, or Petit, Treason. See TREASON.

PETUNSE, in natural history, one of the two substances whereof porcelain or china-ware is made. The petunse is a coarse kind of flint or pebble, the surface of which is not so smooth when broken as that of our common flint. See PORCELAIN.

PETWORTH, in Suffex in England, five miles from Midhurst and the Suffex Downs, and 49 from London, is a large, populous, and handsome town. It is adorned with several seats of gentlemen, particularly the magnificent seat of the Percies, earls of Northumberland, many of whom lie buried in a separate vault of its church. The rectory, the richest in the county, is said to be worth 600 l. or 700 l. a year, and is in the Duke of Somerset's gift: in whose armory, in this place, there is a sword which, by circumstances, appears to have been the weapon of the famous Henry Hotspur, though it is not so unwieldy as other ancient swords generally are.

PEUCEDANUM, or SULPHUR-WORT: A genus of the digynia order, belonging to the pentandria class of plants; and in the natural method ranking under the 45th order, *Umbellata*. The fruit is lobated, striated on both sides, and surrounded by a membrane; the involucre are very short. There are three species; none of which have any remarkable properties excepting the officinale, or common hog's fennel, growing naturally in the English salt marshes. This rises to the height of two feet, with channelled stalks, which divide into two or three branches, each crowned with an umbel of yellow flowers, composed of several small circular umbels. The roots, when bruised, have a strong fetid scent like sulphur, and an acrid, bitterish, unctuous taste. Wounded in the spring, they yield a considerable quantity of yellow juice, which dries into a gummy resin, and retains the strong smell of the root.

This should seem to be possessed of some medicinal virtues, but they have never been ascertained with any precision. The expressed juice was used by the ancients in lethargic disorders.

Peuteman
||
Peyrere.

PEUTEMAN (Peter) was born at Rotterdam in 1650, and was a good painter of inanimate objects; but the most memorable particular relative to this artist was that incident which occasioned his death.

He was requested to paint an emblematical picture of mortality, representing human skulls and bones, surrounded with rich gems and musical instruments, to express the vanity of this world's pleasures, amusements, or possessions; and that he might imitate nature with the greater exactness, he went into an anatomy room, where several skeletons hung by wires from the ceiling, and bones, skulls, &c. lay scattered about; and immediately prepared to make his designs.

While he was thus employed, either by fatigue, or by intense study, insensibly he fell asleep; but was suddenly roused by a shock of an earthquake, which happened at that instant, on the 18th of September 1692. The moment he awoke, he observed the skeletons move about as they were shaken in different directions, and the loose skulls roll from one side of the room to the other; and being totally ignorant of the cause, he was struck with such a horror, that he threw himself down stairs, and tumbled into the street half dead. His friends took all possible pains to efface the impression made on his mind by that unlucky event, and acquainted him with the real cause of the agitation of the skeletons; yet the transaction still affected his spirits in so violent a manner, that it brought on a disorder, which in a very short time ended his days. His general subjects were either allegorical or emblematical allusions to the shortness and misery of human life.

PEWIT, SEA-CROW, or Mire-crow, in ornithology. See LARUS.

PEWTER, a factitious metal used in making domestic utensils, as plates, dishes, &c.—The basis of the metal is tin; which is converted into pewter by mixing at the rate of an hundred weight of tin with 15 pounds of lead and six pounds of brass.—Besides this composition, which makes the common pewter, there are other kinds, compounded of tin, regulus of antimony, bismuth, and copper, in several proportions.

PEYRERE (Isaac la) was born at Bourdeaux, of protestant parents. He entered into the service of the Prince of Conde, who was much pleased with the singularity of his genius. From the perusal of St Paul's writings he took into his head to aver, that Adam was not the first of the human race; and, in order to prove this extravagant opinion, he published in 1655 a book, which was printed in Holland in 4to and in 12mo, with this title, *Præadamita, sive exercitatio super versibus* 12, 13, 14. *cap. 15. Epistolæ Pauli ad Romanos*. This work was burnt at Paris, and the author imprisoned at Brussels, through the influence of the archbishop of Maline's grand vicar. The Prince of Conde having obtained his liberty, he travelled to Rome in 1656, and there gave in to Pope Alexander VII. a solemn renunciation both of Calvinism and Preadamism. His conversion was not thought to be sincere, at least with regard to this last heresy. His desire to be the head of a new sect is evident; and his book discovers his ambition;

Peyrere.

ambition; for he there pays many compliments to the Jews, and invites them to attend his lectures. Upon his return to Paris, notwithstanding the earnest solicitations of his holiness to remain at Rome, he went again into the Prince of Conde's service in the quality of librarian. Some time after he retired to the seminary *des Vertus*, where he died the 30th of January 1676, at the age of 82, after the sacraments of the church had been administered to him. Father Simon says, that when he was importuned in his last moments to retract the opinion which he had formed respecting the Preadamites, his answer was, *Hi quacunq; ignorant, blasphemant*. His having no fixed sentiments of religion is supposed to proceed more from a peculiar turn of mind than a corruption of the heart; for good nature, simplicity of manners, and humanity, seem to have formed his character. "He was, says Nicéron, a man of a very equal temper, and most agreeable conversation. He was a little too fond, however, of indulging his wit, which sometimes bordered on raillery; but he took care never to hurt or wound the feelings of his neighbour. As to his learning, it was extremely limited. He knew nothing either of Greek or Hebrew; and yet he ventured to give a new interpretation of several passages of the sacred volume. He piqued himself on his knowledge of the Latin; but excepting a few poets which he had read, he was by no means an adept in that language. His style is very unequal; sometimes too swelling and pompous, at other times low and grovelling." Besides the work already mentioned, he has left behind him, I. A treatise as singular as it is scarce, intitled, *Du rappel des Juifs*, 1643, in 8vo. The recal of the Israelites, in the opinion of this writer, will be not only of a spiritual nature, but they will be reinstated in the temporal blessings which they enjoyed before their rejection. They will again take possession of the holy land, which will resume its former fertility. God will then raise up to them a king more just, and more victorious, than any of their former sovereigns had been. Now, though all this is doubtless to be understood spiritually of Jesus Christ, yet our author is of opinion, that it ought also to be understood of a temporal prince, who shall arise for the purpose of effecting the temporal deliverance of the Jews; and that this prince shall be no other than the king of France, for the following reasons, which, it is believed, will carry conviction to few minds: 1. Because the two titles of *Most Christian*, and of *Eldest Son of the Church*, are ascribed to him by way of excellence. 2. Because it is presumable, if the kings of France possess the virtue of curing the evil or scrofula, which can only afflict the bodies of the Jews; that they will likewise have the power of curing their obstinate incredulity and the other inveterate diseases of their souls. 3. Because the kings of France have for their arms a *fleur de luce*; and because the beauty of the church is in scripture compared to the beauty of lilies. 4. Because it is probable that France will be the country whither the Jews shall first be invited to come and embrace the Christian faith, and whither they shall retreat from the persecution of the nations that have dominion over them; for France is a land of freedom, it admits of no slavery, and whoever touches it is free. Peyrere, after explaining his strange system, proposes a method of converting

the Jews to Christianity; a method, says Nicéron, which will not be acceptable to many. He proposes to reduce the whole of religion to a bare faith or belief in Jesus Christ; taking it for granted, without any shadow of proof, that "it is as difficult to comprehend the articles of our faith, as to observe the ceremonies of Moses.—From this scheme (says he) there would result a double advantage to the church; the reunion of the Jews, and of all those Christians who are separated from the body of the church." Peyrere, when he wrote this book, was a Calvinist; but his Calvinism too nearly resembled the Deism of our age. He confessed himself that his reason for quitting the Protestants was on account of their being the first and principal opposers of his book concerning the Preadamites. II. A curious and entertaining account of Greenland, printed in 8vo, 1647. When he was asked, on occasion of this work, why there were so many witches in the north? he replied, "It is because part of the property of these pretended conjurers, when condemned to suffer death, is declared to belong to their judges." III. An equally interesting account of Iceland, 1663, 8vo. IV. A letter to Philotimus, 1658, in 8vo, in which he explains the reasons of his recantation, &c. We find in Moreri the following epitaph of him, written by a poet of his own times.

La Peyrere ici git, ce bon Israelite,
Huguenot, Catholique, enfin Preadamite :
Quatre religions lui plurent à la fois,
Et son indifférence étoit si peu commune,
Qu'après quatre-vingts ans qu'il eut à faire un
choix,

Le bon homme partit, & n'en choisit pas une.

PEYRONIUS (Francis de la) for a long time practised surgery at Paris with such distinguished éclat, that he obtained for himself the appointment of first surgeon to Louis XV. He improved this favourable situation with his majesty, and procured to his profession those honours which had the effect to quicken its progress, and those establishments which contributed to extend its benefits. The Royal College of Surgery at Paris was founded by his means in 1731, was enlightened by his knowledge, and encouraged by his munificence. At his death, which happened at Versailles the 24th of April 1747, he bequeathed to the society of surgeons in Paris two thirds of his effects, his estate of Marigni, which was sold to the king for 200,000 livres, and his library. This useful citizen also left to the society of surgeons at Montpellier two houses, situated in that town, with 100,000 livres, for the purpose of erecting there a chirurgical amphitheatre. He appointed the same society universal legatees for the third of his effects; and all these legacies contain clauses whose sole object is to promote the public good, the perfection and improvement of surgery; for which he always solicited the protection of the court. At the time of the famous dispute between the physicians and surgeons, he entreated the Chancellor d'Aguesseau to build up a brazen wall between the two bodies. "I will do so, replied the minister, but on what side of the wall shall we place the sick?" Peyronius afterwards behaved with more moderation.—He was a philosopher without any ostentation; but his philosophy was tempered by a long acquaintance with the world and with the court. The acuteness and delicacy of
his

Peyrere.
Peyronius.

Pezay
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Pezron.

his understanding, joined to his natural vivacity, rendered his conversation agreeable; and all these advantages were crowned with a quality still more valuable, an uncommon degree of sympathy for those in distress. He was no sooner known to be at his estate in the country, than his house was filled with sick people, who came to him from the distance of 7 or 8 leagues round about. He had once a plan of establishing, on this spot, an hospital, to which he intended to retire, that he might devote the remainder of his life to the service of the poor.

PEZAY (N. Maffon, marquis of), born at Paris, very early applied himself to the study of letters, and afterwards went into the army. He was made a captain of dragoons; and had the honour of giving some lessons on tactics to the ill-fated Louis XVI. Being appointed inspector general of some coasting vessels, he repaired to the maritime towns, and executed his commission with more care and attention than was to have been expected from a votary of the muses. But as, at the same time, he showed too much haughtiness, a complaint was brought against him to the court, and he was banished to his country seat, where he died soon after, in the beginning of 1778. He was the intimate friend and companion of Dorat. He had studied, and successfully imitated, his manner of writing; but his poems have more delicacy, and are less disfigured with trifling conversations of gallantry. He has left behind him, 1. A translation of Catullus, which is not much esteemed. 2. *Les Soirées Helvétiques, Alsaciennes, & Franc-Comtoises*, in 8vo, 1770; a work very agreeably diversified, full of charming landscapes, but written with too little accuracy. 3. *Les Soirées Provençales*, in manuscript, which are said to be nowise inferior in merit to the foregoing ones. 4. *La Rosière de Salency*; a pastoral in three acts, and which has been performed with success on the Italian theatres. 5. *Les campagnes de Mailebois*, in 3 vols 4to, and a volume of maps.

PEZENAS, a place in France about 24 miles from Montpellier. The soil about it is sandy. The rock is limestone. The fields are open, and produce corn, wine, and oil. There are to be seen at this place the extensive ruins of a castle, which formerly belonged to the Montmorency family. This strong fortress was hewn out of the rock on which it stands, and appears to have been complicated and full of art. The walls are lofty, and above 8 feet in thickness. The rock, which is perpendicular, is a mass of shells, such as turbinæ, oysters, cockles, with a calcareous cement. From hence the circumjacent plain, decked with luxuriant verdure, and shut in by rugged mountains, affords a most delightful prospect. E. Long. 3. 35. N. Lat. 43. 18.

PEZIZA, cup-mushroom, in botany; a genus of the natural order of fungi, belonging to the cryptogamia class of plants. The fungus campanulated and sessile. Linnaeus enumerates 8 species.

PEZRON (Paul), a very learned and ingenious Frenchman, born at Hennebont in Brittany in 1639, and admitted into the order of Cîteaux in 1660. He was a great antiquary, and was indefatigable in tracing the origin of the language of the Goths; the result of which was, that he was led to espouse a system of the world's being much more ancient than modern chronologers have supposed. This he communicated

to the public in a treatise printed at Paris in 1687, 4to, intitled, *The antiquity of Time, restored and defended against the Jews and modern chronologers*. This book of Pezron's was extremely admired for the ingenuity and learning in it; yet caused no small alarm among the religious, against whom he nevertheless defended his opinions. He went through several promotions, the last of which was to the abbey of Charmoye, to which he was nominated by the king; and died in 1706.

PHACA, in botany: A genus of the decandria order, belonging to the diadelphia class of plants; and in the natural method ranking under the 32d order, *Papilionacea*. The legumen is semibilocular.

PHÆA, a famous sow which infested the neighbourhood of Cromyon. Theseus destroyed it as he was travelling from Trœzene to Athens to make himself known to his father. Some imagine that the boar of Calydon sprang from this sow. According to some authors, Phæa was a woman who prostituted herself to strangers, whom she murdered, and afterwards plundered.

PHÆACIA, one of the names of the island Corcyra, (Homer, Stephanus). *Phæaces* the people, (Ovid), noted for their indolence and luxury: hence Horace uses *Phæax* for a person indolent and sleek; and hence arose their insolence and pride, (Aristotle). The island was famous for producing large quantities of the finest flavoured apples, (Ovid, Juvenal, Propertius).

PHÆDON, a disciple of Socrates, who had been seized by pirates in his youth; and the philosopher, who seemed to discover something uncommon and promising in his countenance, bought his liberty for a sum of money, and ever after esteemed him. Phædon, after Socrates's death, returned to Elis his native country, where he founded a sect of philosophers who composed what was called the *Eliac school*. The name of Phædon is affixed to one of Plato's dialogues.

PHÆDRA (fab. hist.) was a daughter of Minos and Pasiphaë; she married Theseus, by whom she was the mother of Acamas and Demophoon. They had already lived for some time in conjugal felicity, when Venus, who hated all the descendants of Apollo, because he had discovered her amours with Mars, inspired Phædra with the strongest passion for Hippolytus the son of Theseus, by the amazon Hippolyte. This passion she long attempted to stifle, but in vain; and therefore, in the absence of Theseus, she addressed Hippolytus with all the impatience of desponding love. He rejected her with horror and disdain. She, however, incensed by the reception she had met, resolved to punish his coldness and refusal; and at the return of Theseus she accused Hippolytus of attempts upon her virtue. He listened to her accusation; and without hearing Hippolytus's defence, he banished him from his kingdom, and implored Neptune, who had promised to grant three of his requests, to punish him in an exemplary manner. As Hippolytus fled from Athens, his horses were suddenly terrified by a sea monster, which Neptune had sent on the shore; and he was thus dragged through precipices and over rocks, trampled under the feet of his horses, and crushed under the wheels of his chariot. When his tragical end was known at Athens, Phædra confessed her crime, and hung herself.

Phaca
||
Phædra.

Phædrus
||
Phæton.

self in despair, unable to survive one whose death her extreme guilt had occasioned. The death of Hippolytus, and the infamous passion of Phædra, is the subject of one of the tragedies of Euripides and of Seneca. She was buried at Trœzene, where her tomb was still to be seen in the age of the geographer Pausanias, near the temple of Venus, which she had built to render the goddess favourable to her incestuous passion. Near her tomb was a myrtle, whose leaves were full of small holes, which, it was reported, Phædra had done with a hair pin, when the vehemence of her passion had rendered her melancholy and almost desperate. She was represented in a painting in Apollo's temple at Delphi, as suspended in the air, while her sister Ariadne stood near to her, and fixed her eyes upon her.

PHÆDRUS, an ancient Latin writer, who composed five books of fables, in Iambic verse. He was a Thracian; and was born, as there is reason to conclude, some years before Julius Cæsar made himself master of the Roman empire. How he came into the service of Augustus is not known: but his being called *Augustus's freedman* in the title of the book, shows that he had been that emperor's slave. The fables of Phædrus are valued for their wit and good sense, expressed in very pure and elegant language: and it is remarkable that they remained buried in libraries altogether unknown to the public, until they were discovered and published by Peter Pithou, or Pithœus, a learned French gentleman, toward the close of the 16th century.

PHÆDRUS (Thomas) was a professor of eloquence at Rome, early in the 16th century. He was canon of Lateran, and keeper of the library in the Vatican. He owed his rise to the acting of Seneca's Hippolytus, in which he performed the part of Phædra; from whence he ever after got the name of Phædrus. Erasmus, who tells this, says he had it from cardinal Raphael Georgianus, in whose court-yard, before the palace, that tragedy was acted. The cause of his death was very remarkable; for as he was riding through the city on a mule, he met a cart drawn by wild oxen, and was thrown by his mule, who took fright at them. Though corpulent, the cart fortunately passed over him without doing him any hurt, as he fell in the space between the wheels; but fright and the fall together spoiled the whole mass of his blood so much, that he contracted a distemper, of which, after languishing some time, he died under the age of 50. If he had lived, he would most probably have become an author; and perhaps, adds Bayle, have confirmed what has been observed of him, that his tongue was better than his pen. The observation was made by Erasmus, who tells us, that he knew and loved him; and owns that he was called the Cicero of his time. Janus Parrhasius, his colleague, was much grieved at his death, and gave the titles of several works, which were almost ready for public view.

PHÆNOMENON, in philosophy, denotes any remarkable appearance, whether in the heavens or earth, and whether discovered by observation or experiment.

PHÆTON, in fabulous history, was the son of the Sun, or Phœbus and Clymene, one of the Oceanides. He was son of Cephalus and Aurora, according to He-

siod and Pausanias; or of Tithonus and Aurora, according to Apollodorus. He is, however, more generally acknowledged to be the son of Phœbus and Clymene. He was naturally of a lively disposition, and a handsome figure. Venus became enamoured of him, and entrusted him with the care of one of her temples. This distinguishing favour of the goddess rendered him vain and aspiring; and when Epaphus, the son of Io, had told him, to check his pride, that he was not the son of Phœbus, Phæton resolved to know his true origin, and at the instigation of his mother he visited the palace of the sun. He begged Phœbus, that if he really were his father he would give him incontestable proofs of his paternal tenderness, and convince the world of his legitimacy. Phœbus received him with great tenderness, and swore by Styx to grant whatever he requested as a proof of his acknowledging him for his son. The youth boldly asked the direction of the chariot of the sun for one day. His father, grieved and surprised at this demand, used all his arguments to dissuade him from the rash attempt; but all was in vain: and being by his oath reduced to submit to his obstinacy, entrusted him with the reins, after he had directed him how to use them. The young adventurer was however soon sensible of his madness. He was unable to guide the fiery steeds; and loosing the reins, Jupiter, to prevent his consuming the heavens and earth, struck him with a thunderbolt, and hurled him from his seat into the river Eridanus or Po. His sisters Phaethusa, Lambetia, and Phœbe, lamenting his loss upon its banks, were changed by the gods into black poplar trees; and Cynus king of Liguria, also grieving at his fate, was transformed into a swan.

The poets say, that while Phæton was driving the chariot of his father, the blood of the Ethiopians was dried up; and their skin became black; a colour which is still preserved among the greatest part of the inhabitants of the torrid zone. The territories of Libya were also, they tell us, parched up, on account of their too great vicinity to the sun; and ever since, Africa, unable to recover her original verdure and fruitfulness, has exhibited a sandy country and uncultivated waste. According to those who explain this poetical fable, Phæton was a Ligurian prince, who studied astronomy, and in whose age the neighbourhood of the Po was visited with uncommon heats.

PHÆTON, in ornithology, a genus of birds belonging to the order of anseres; the characters of which are: The bill is sharp, straight, and pointed; the nostrils are oblong, and the hinder toe is turned forward. There are two species, viz.

1. The demersus, or red-footed penguin, has a thick, arched, red bill; the head, hind-part of the neck, and the back, of a dusky purplish hue, and breast and belly white; brown wings, with the tips of the feathers white; instead of a tail, a few black bristles; and red legs. It is found on Penguin isle, near the Cape of Good Hope, is common all over the South Seas, and is about the size of a goose.

2. The ethereus, or tropic bird, is about the size of a partridge, and has very long wings. The bill is red, with an angle under the lower mandible. The eyes are encompassed with black, which ends in a point towards

Phæton.

Phæton. wards the back of the head. Three or four of the larger quill feathers, towards their ends, are black, tipped with white; all the rest of the bird is white, except the back, which is variegated with curved lines of black. The legs and feet are of a vermilion red. The toes are webbed. The tail consists of two long straight narrow feathers, almost of equal breadth from their quills to their points. See Plate CCCLXXXIX.

"The name *tropic bird* (says Latham), given to this genus, arises from its being chiefly found within the tropic circles; but we are not to conclude, that they never stray voluntarily, or are driven beyond them; for we have met with a few instances to prove the contrary (A). It is, however, so generally found within the tropical limits, that the sight of this bird alone is sufficient to inform the mariner of a very near approach to if not his entrance therein. It has also been thought to portend the contiguity of land (B); but this has often proved fallacious, as it is not unfrequently found at very great distances therefrom. The flight of this bird is often to a prodigious height; but at other times it is seen, along with the frigate pelican, booby, and other birds, attending the flying fishes at their rise from the water, driven from their native element into the air by their watery enemies, the shark (C), porpoise, albacore, bonito, and dolphin, which pursue them beneath, and prey upon them. These birds are sometimes observed to rest on the surface of the water, and have been now and then seen in calm weather upon the backs of the drowsy tortoises, supinely floating in the sea, so that they have been easily taken by the long boat manned. On shore they will perch on trees; and are said to breed in the woods, on the ground beneath them. They have been met with in plenty on the islands of St Helena, Ascension, Mauritius, New Holland, and various places in the South Seas; but in no place so numerous as at Palmerston Island, where these birds, as well as the frigates, were in such plenty, that the trees were absolutely loaded with them, and so tame, that they suffered themselves to be taken off the boughs with the hand. At Otaheite, and in the Friendly isles, the natives give them the names of *haingoo* and *toolaiee*.

"As the tropic bird sheds the long tail feathers every year, the inhabitants of such isles as they frequent, collect and make use of them by way of ornament in various manners; they are worn in the caps of the Sandwich islanders, being in great plenty at Tahoorā, as also in various parts of their dress; but in none more conspicuous than in the mourning garment of Ota-

Phæton. heite, in which island numbers are picked up in the mountainous parts, where it also breeds. The flesh cannot be called good, but was found sufficiently acceptable to those who had long been confined to salt provisions, and in which circumstance the sailors did not despise it."

There is a variety of this bird called by Latham the *white tropic bird*. It is less than the one we have already described, and is found in as many places as it. The plumage of this bird is in general of a silvery white. The yellow tropic bird is a further variety of the same species, the plumage being of a yellowish white. These differences, Mr Latham thinks, arise merely from age, if they are not the distinguishing mark of sex.

3. The black-billed tropic bird is smaller than any of the former. The bill is black; the plumage on the upper part of the body and wings is striated, partly black and partly white; before the eye there is a large crescent of black, behind it is a streak of the same; the forehead and all the under parts of the body are of a pure white colour; the quills and tail are marked as the upper parts, but the ends of the first are white, and most of the feathers of the last are marked with dusky black at the tips; the sides over the thighs are striated with black and white; the legs are black. One of these was found at Turtle and Palmerston islands, in the South Seas, and is in the possession of Sir Joseph Banks.

4. The red-tailed tropic bird is in length about two feet ten inches, of which the two tail feathers alone measure one foot nine inches. The bill is red; the plumage white, tinged of an elegant pale rose-colour; the crescent over the eyes is somewhat abrupt in the middle; the ends of the scapulars are marked with black. This bird is distinguished from others by two middle long tail feathers, which are of a beautiful deep red colour, except the shafts and base, which are black; the sides over the thighs are dusky; and the legs are black.

"This species (says Latham) is met with frequently at large as the others, but does not seem to be so far spread. Our navigators met with them in various places, though they were seldom seen by them on shore except in the breeding season, which is in September and October. They are found in great numbers in the island of Mauritius, where they make the nest in hollows in the ground under the trees; the eggs are two in number, of a yellowish white marked with rufous spots.

(A) "Dr Forster observes, that they are never seen beyond 28 degrees of latitude; but others talk of their spreading far beyond it. In lat. 32. 45. *Ell. Narr.* ii. p. 64.—33. 10. N. *Cook's last Voy.* iii. p. 178.—38. 34. S. *Park. Voy.* p. 132.—38. 29. S. *Hawkes. Voy.* iii. p. 77. This is mentioned as not being common; but Kalm says he met with these in 40 degrees north. See *Trav.* i. p. 22.—And a friend of mine assured me, that he saw one in latitude 47½ north; but at the same time observed, that it was the first instance he had ever known of such a circumstance.

(B) "*Ulloa's Voy.* ii. p. 301. He observes, that they seldom are met with above eight or ten leagues from land.

(C) "*Squalus conductor, delphinus phocaena, scomber thynnus, scomber pelamis, delphinus coryphæna.* See *Phil. Trans.* vol. lxxviii. p. 800. It is there observed, that the flying fish is able to fly 60 or more yards at one stretch, and repeat it a second or even a third time, only the slightest momentary touch of the surface that can be conceived intervening; and it is common in these flights for them to fly against ships, or fall on the deck.

Phage-
dæna
||
Phalæna.

spots. The same author gives an account of the introduction of paradise grackles into the island of Bourbon, from whence they spread into that of Mauritius; at first intended for the very useful purpose of destroying the locusts and grasshoppers, which swarmed there to a great degree: the result of their prodigious increase, and the unlooked for consequence of it, he has likewise mentioned. These birds, we are told, are great enemies to the tropic birds, ocular demonstration of which was had by M. de Querhoent; for, being seated beneath a tree in which were perched a number of the grackles, he observed a tropic bird come to its hole, in order to go to the nest; but the grackles attacked the bird all at once, and obliged it to fly off; it then returned with its consort in company, but without effect, as they were both driven away, as the single one had been before; when the grackles returned to their tree, and the spectator left them in that situation.

"This species of tropic bird has been met with in several places of the South Seas; very common at Palmerston and Turtle islands; at Hervey's island in the greatest plenty, and of which considerable numbers were killed for provisions; and here also they make the nests in the same manner as at Mauritius. The name it is known by at Otaheite and the Friendly isles is *tawagge* and *totto*." See DIOMEDEA and PINGVIN.

PHAGEDÆNA, in medicine, denotes a corroding ulcer.

PHAGEDENIC MEDICINES, those used to eat off proud or fungous flesh; such as are all the caustics.

PHAGEDENIC Water, in chemistry, denotes a water made from quicklime and sublimate; and is very efficacious in the cure of phagedenic ulcers. To prepare this water, put two pounds of fresh quicklime in a large earthen pan, and pour upon it about ten pounds of rain-water; let them stand together for two days, stirring them frequently: at last leave the lime to settle well, then pour off the water by inclination, filtrate it, and put it up in a glass bottle, adding to it an ounce of corrosive sublimate in powder; which from white becomes yellow, and sinks to the bottom of the vessel. The water being settled, is fit for use in the cleansing of wounds and ulcers, and to eat off superfluous flesh, and especially in gangrenes; in which case may be added to it a third or fourth part of spirit of wine.

PHALÆNA, the MOTH, in zoology, a genus of insects belonging to the order of lepidoptera. The feelers are cetaceous, and taper gradually towards the points; the wings are often bent backwards.

Barbut divides this genus into eight families, and we are told that there are no less than 460 species. The names of the several families are given by Barbut as follows: 1. The *attari*, whose wings incline downwards and are spread open: they have pectinated antennæ without a tongue, or pectinated antennæ with a spiral tongue, or cetaceous antennæ with a spiral tongue. 2. The *bombyces*, whose wings cover the body in a position nearly horizontal, and which have pectinated antennæ. They are either *elingues*, which want the tongue, or have it so short as not to be manifestly spiral; their wings are either reversed or deflected: or *spirilingues*, which have a spiral tongue; and are

either læves with smooth backs, or *cristatæ* dorso with a kind of crest or tuft of hair on the back. 3. The *noctuxæ*, whose wings are incumbent as in the *bombyces*, from which they differ chiefly in the formation of the antennæ, which are cetaceous. The *noctuxæ* are either *elingues*, wanting tongues, or *spirilingues* having spiral tongues. 4. The *geometræ*, whose wings when at rest are extended horizontally: the antennæ in one subdivision of this section are pectinated, in another cetaceous; the under wings in each of these divisions are either angulated, or round with entire edges. 5. The *tortrices*. The wings are exceeding obtuse, their exterior margin is curve, and declines towards the sides of the body. They have short palpi. 6. The *pyralides*. The inner margins of the wings in this section are laid one over the other; the wings themselves decline a little towards the sides of the body, and in shape resemble a delta; they have considerable palpi of different forms. 7. The *tineæ*. The wings are wrapped up or folded round the body, so as to give the insect a cylindrical form; the forehead is stretched out or advanced forwards. 8. The *alucitæ*. The wings of this division are split, or divided into branches almost to their base.

The caterpillars of this genus vary much as to size, and considerably as to their shape and number of feet. It is remarkable, that caterpillars of almost every species of this genus are found with 10, 12, 14, and 16 feet. The last are the most common and the largest; those of 10 and 12 feet are called *geometræ*. "Amongst the *geometræ* caterpillars (says Barbut) there are some very singular, whether for their colour, or the tubercula which they bear, or lastly for the difference of their attitudes. Many resemble small branches or bits of dry wood; and that resemblance may be a means of saving many of those insects from the voraciousness of birds, who do not so easily discern them. Other caterpillars are very hairy, while several are quite smooth; the latter have a cleaner look, whereas the hairy ones have something hideous, and may even be hurtful when touched.

"All the caterpillars of *phalænæ*, after having several times cast their slough, spin their cod, in which they are transformed to chrysalids. But the texture of the cod, the fineness of the thread of which it is composed, and the different matters joined to the threads, are infinitely various.

"The chrysalids of *phalænæ* are generally oblong ovals, not angulous as those of butterflies, nor so soon transformed to perfect insects. They remain a much longer time within the cod, the greatest part not coming forth till the ensuing year. Some I have met with that remained in that state during two or three years successively. Heat or cold contribute greatly to forward or put back their final metamorphosis; a fact which may be ascertained by procuring them a certain degree of moderate heat, by which means one may see *phalænæ* brought forth upon one's mantle-piece in the depth of winter.

"The *phalænæ* or perfect insects sprung from those cods, are generally more clumsy and heavy than butterflies; their colours are likewise more brown, dim, and obscure, though there are some *phalænæ* whose colours are very lively and brilliant. Several of them

Phalæna.

fly

Phalæna. fly only in the evening, keeping quiet and close under leaves in the day-time; and this has induced some authors to give them the name of *night butterflies*. In summer evenings they find their way into rooms, attracted by the lights round which they are seen to hover. And indeed a sure method of catching a great number of *phalænæ* is to hunt them by night in a bower with a lantern. They all resort to the light of the lantern, about which great numbers of them may be caught.

"A remarkable circumstance has been observed of these *phalænæ*, which is, that the females of some of them are without wings. By their looks they never would be taken for *phalænæ*. They have the appearance of a large, short, six-legged, creeping animal, while their male is winged and active. Yet this heavy creature is a real *phalæna*, easily distinguished by its antennæ. It even has wings, but so short that they are no more than small protuberances placed at the extremity of the thorax, and that appear quite useless. Those *phalænæ* whose females are destitute of wings are generally in the number of those whose antennæ are pectinated. The unwinged females have antennæ similar to those of the males, but with shorter beads only. Their body is also charged with scales, the characteristic of insects of this order."

To describe every species of this extensive genus would be impossible; we shall therefore only take notice of a very few, of which we have given engravings.

The *phalæna attacus pavonia minor*. See N° 1. Plate CCCLXXXIX. The wings of this insect, says Barbut, are brown, undulated, and variegated, having some grey in the middle, and a margin one line broad; in its colour yellowish grey. The under part has more of the grey cast, but the extremities of the wings before the margin have a broad band of brown. The four wings, as well above as beneath, have each a large eye, which eyes are black encompassed with a dun-coloured circle, and above that with a semicircle of white, then another of red, and lastly the eye is terminated by a whole circle of black. Across the middle of the eye is drawn transversely a small whitish line. The caterpillar is green, has 16 feet with rose-colour tubercula, charged with long hairs terminated by a small knob; besides which, it has dun-colour or reddish rings. It is found upon fruit-trees.

Phalæna alucita pentadactyla, N° 2. The eyes of this species are black; the body is of a pale yellow. The wings are snow white, and the insect keeps them stretched asunder when at rest. The superior are divided in two, or rather appear composed of two stumps of bird's feathers united at the base. The inferior ones are likewise divided into three threads or bristles, which are furnished on both sides with fine fringes. The caterpillar is of a green colour, dotted with black, and charged with a few hairs. It feeds upon grass, changes to a chrysalis in or about September, and appears a moth in August, frequenting woods.

Phalæna noctua elinguis humuli, N° 3. In this species the wings of the male are of a snowy white; of the female yellowish, with streaks of a deeper hue; the shoulders, abdomen, &c. in both sexes, are deep yellow. The antennæ are pectinated and shorter than

the thorax. The caterpillar feeds upon the roots of *Phalæna*: burdock, hops, &c. changes into a chrysalis in May, appears in the winged state in June, frequenting low marshy grounds where hops grow.

Phalæna noctua pronuba spirilinguis, N° 4. The thorax, head, antennæ, feet, and upper wings, are of a brown colour, more or less dark, sometimes so deep as to be nearly black, but often of a bluish cast. The upper wings are moreover somewhat clouded, and have two black spots, one on the middle, the other towards the outward angle of the lower part of the wing. The under ones are of a beautiful orange colour, with a broad black band near the lower edge of the wing, of which it follows the direction. The caterpillar is smooth; to be found on several plants, but particularly upon the thlaspi and some other cruciferous plants. It keeps in concealment during the day, and only feeds by night. Its metamorphosis is performed underground, and some varieties of colour are observable amongst these caterpillars; some being green, others brown; which latter yield males, the former females.

Phalæna tortrix prasinana. The superior wings of this species are of a fine green colour, having two diagonal yellow bars on each, the body and inferior wings are whitish, shaded with yellowish green. The caterpillar is a pale yellowish green, ornamented with small brown specks or spots, the tail being forked and tipped with orange red colour; feeds on the oak, changes to a chrysalis in September, and assumes the fly-state about May, frequenting woods.

PHALANGIUM, in zoology, a genus of insects belonging to the order of aptera. They have eight feet, two eyes on the top of the head placed very near each other, and other two on the sides of the head: the feelers resemble legs, and the belly is round. There are nine species.

Mr Barbut only describes one species, viz. the *phalangium opilis* of Linnæus. His description is as follows: "Its body is roundish, of a dusky brown on the back, with a duskier spot of a rhomboidal figure near the middle of it. The belly is whitish; the legs are extremely long and slender. On the back part of the head there stands a little eminence, which has on it a kind of double crest, formed as it were of a number of minute spines; the eyes are small and black, and are two in number. It is commonly called the *shepherd spider*."

"This species of spider multiplies singularly. They are great spinners. In autumn the stubble is quite covered with the threads of these spiders, by means of which they travel with ease, and ensnare their prey. However, those threads are thought rather to be the produce of a species of tick called *autumnal-weaver*. A small degree of attention discovers an amazing multitude of those ticks almost imperceptible, and that is their work. The threads, when united, appear of a beautiful white, wave about in the air, and are known in the country by the name of *virgin's threads*. Some naturalists think, that those threads, floating in the air, serve the insect as sails to waft it through the air, and as a net to entrap insects on the wing; for remnants of prey, say they, are discoverable in them. As to those parcels in which nothing is seen, they are only essays rejected by those travelling insects. The analogy between the phalangium and the crab, and the facility with

Phalangosis
Phalanx.

with which it parts with its legs to save the rest of the body, has raised a presumption that its legs might grow again, as do those of crabs and lobsters. Country people have an opportunity to endeavour at ascertaining the truth of these observations."

PHALANGOSIS, in surgery, is a tumor and relaxation of the eye-lids, often so great as to deform the eye, and considerably to impede vision. Sometimes the eye-lid when in this state subsides or sinks down, occasioned perhaps either by a palsy of the muscle which sustains and elevates the eye-lid, or else from a relaxation of the cutis above, from various causes. Sometimes an oedematous or aqueous tumor is formed on the eye-lids, so as almost entirely to exclude vision; but this last case should be distinguished from the other, and may be easily remedied by the use of internal and topical medicines, such as purges and diuretics given inwardly, and a compress dipped in warm spirit of wine and lime-water. But in the paralytic or relaxed case, the use of cordial and nervous medicines must be proposed internally; and outwardly, balsam of Peru and Hungary water are to be employed. If all these fail, the remaining method of cure is to extirpate a sufficient quantity of the relaxed cutis; and then, after healing up the wound, the remainder will be sufficiently shortened.

PHALANX, in Grecian antiquity, a square battalion of soldiers, with their shields joined and pikes crossing each other; so that it was next to impossible to break it.

The Macedonian phalanx is supposed by some to have had the advantage, in valour and strength, over the Roman legion. Its number was 8000 men. But the word *phalanx* is used for a party of 28, and several other numbers; and even sometimes for the whole body of foot. See *LEGION*.

PHALANX is applied, by anatomists, to the three rows of small bones which form the fingers. In natural history it is a term which Dr Woodward and some other writers of fossils have used to express an arrangement of the columns of that sort of fossil coralloide body found frequently in Wales, and called Woodward's lithostrotion. In the great variety of specimens we find of this, some have the whole phalanx of columns cracked through, and others only a few of the external ones; but these cracks never remain empty, but are found filled up with a white spar, as the smaller cracks of stone usually are. This is not wonderful, as there is much spar in the composition of this fossil; and it is easily washed out of the general mass to fill up these cracks, and is then always found pure, and therefore of its natural colour, white.

The lithostrotion, or general congeries of these phalanges of columns, is commonly found immersed in a grey stone, and found on the tops of the rocky cliffs about Milford in Wales. It is usually erect, though somewhat inclining in some specimens, but never lies horizontal. It seems to have been all white at first, but to have been since gradually tinged with the matter of the stone in which it lies. The single columns, which form each phalanx, are usually round or cylindric, though sometimes flatted and bent; some of them are also naturally of an angular figure; these, however, are not regular in the number of their angles, some consisting of three sides, some of five, and some

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of seven; some are hexangular also, but these are scarce. They are from five or six to sixteen inches in length; and the largest are near half an inch over, the least about a quarter of an inch; the greater number are very equal to one another in size; but the sides of the columns being unequal, the same column measures of a different thickness when measured different ways; the phalanges or congeries of these are sometimes of a foot or more in diameter.

The columns are often burst, as if they had been affected by external injuries; and it is evident that they were not formed before several other of the extraneous fossils; for there are found sometimes shells of sea-fishes and entrochi immersed and bedded in the bodies of the columns. It appears plainly from hence, that when these bodies were washed out of the sea, and tossed about in the waters which then covered the tops of these cliffs, this elegant fossil, together with the stony bed in which it is contained, were so soft, that those other bodies found entrance into their very substance, and they were formed as it were upon them. This fossil takes an elegant polish, and makes in that state a very beautiful appearance, being of the hardness of the common white marble, and carrying the elegant structure visible in the smallest lineaments.

PHALARIS, a remarkable tyrant, born at Crete, where his ambitious designs occasioned his banishment: he took refuge in Agrigentum, a free city of Sicily, and there obtained the supreme power by stratagem. The circumstance which has chiefly contributed to preserve his name in history is his cruelty; in one act of which he gave, however, an example of strict justice. It is thus related: Perillus, a brass-founder at Athens, knowing the cruel disposition of Phalaris, contrived a new species of punishment for him to inflict on his subjects. He cast a brazen bull, bigger than the life, with an opening in the side to admit the victims; who being shut up in the body, a fire was kindled under it to roast them to death; and the throat was so contrived, that their dying groans resembled the roaring of a bull. The artist brought it to the tyrant, expecting a great reward. Phalaris admired the invention and workmanship, but ordered the inventor to be put into it to make the first trial. In allusion to which, Ovid says,

—Neque enim lex aequior ulla,
Quam necis artifices arte perire sua.

The end of this detestable tyrant is differently related; but it is very generally believed, with Cicero, that he fell by the hands of the Agrigentines; and, as some suppose, at the instigation of Pythagoras. Ovid tells us, that his tongue was cut out; and that he was then put into the bull to perish by the same slow fire by which means he had murdered so many before. Others say that he was stoned to death; and all agree that his end was violent. He reigned, Eusebius says, 28 years; others say 16. After all, there is great uncertainty both as to his life, death, and history. Many of the circumstances related of him, as they are collected by Mr Boyle, depend upon the authenticity of those epistles which go under the name of the tyrant; and which have been justly questioned, and with great probability rejected, as the spurious production of some modern sophist. See BENTLEY, p. 177. col. 2.

L I

PHALARIS,

Phalaris.

Phalaris
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Phallus.

PHALARIS, or *Canary-grass*, in botany; a genus of the trigynia order, belonging to the triandria class of plants. The calyx is bivalved, carinated, and equal in length, containing the corolla. There are ten species, of which the most remarkable are the canariensis, or manured Canary-grass; and the arundinacea, or reed Canary-grass. These are both natives of Britain. The first grows by the road-sides; and is frequently cultivated for the sake of the seeds, which are found to be the best food for the Canary and other small birds. The second grows on the banks of rivers. It is used for thatching ricks or cottages, and endures much longer than straw. In Scandinavia they mow it twice a-year, and their cattle eat it. There is a variety of this cultivated in our gardens with beautifully striped leaves. The stripes are generally green and white; but sometimes they have a purplish cast. This is commonly called *painted lady-grass*, or *ladies-tresses*.

PHALERÆ, among the ancient Romans, were military rewards bestowed for some signal act of bravery. Authors do not agree whether the Phaleræ were a suit of rich trappings for a horse, or golden chains something like the torques, but so formed as to hang down to the breast and display a greater profusion of ornament. The last opinion appears to have the greater prevalence, but perhaps both are true.

PHALEREUS (Nepos), a village and port of Athens; this last neither large nor commodious, for which reason Themistocles put the Athenians on building the Piræus; both joined to Athens by long walls. The Phalereus lay nearer the city (Pausanias). Demetrius Phalereus, the celebrated scholar of Theophrastus, was of this place; to whom the Athenians erected above 300 statues; which were afterwards destroyed by his enemies, on his flight to Ptolemy king of Egypt (Strabo). Here Demosthenes was wont to declaim, to accustom his voice to surmount the noise and roaring of the sea; a just and lively emblem of popular assemblies.

PHALEUCIAN VERSE, in ancient poetry, a kind of verse consisting of five feet; the first of which is a spondee, the second a dactyl, and the three last trochees.

PHALLUS, the *MOREL*, in botany; a genus of the order of fungi, belonging to the cryptogamia class of plants. The fungus is reticulated above and smooth below. There are two species.

1. The *esculentus*, or *esculent morel*, is a native of Britain, growing in woods, groves, meadows, pastures, &c. The substance, when recent, is wax-like and friable; the colour a whitish yellow, turning brownish in decay; the height of the whole fungus, about four or five inches. The stalk is thick and clumsy, somewhat tuberous at the base, and hollow in the middle. The pileus is either round or conical; at a medium about the size of an egg, often much larger; hollow within; its base united to the stalk; and its surface cellular, or latticed with irregular sinuses. The magnified seeds are oval. It is much esteemed at table both recent and dried, being commonly used as an ingredient to heighten the flavour of ragouts. We are informed by Gleditsch, that morels are observed to grow in the woods of Germany in the greatest plenty in those places where charcoal has been made. Hence the good women who collect them to sell, receiving a

hint how to encourage their growth, have been accustomed to make fires in certain places of the woods, with heath, broom, vaccinium, and other materials, in order to obtain a more plentiful crop. This strange method of cultivating morels being however sometimes attended with dreadful consequences, large woods having been set on fire and destroyed by it, the magistrate thought fit to interpose his authority, and the practice is now interdicted.

2. The *impudicus*, stinking morel, or stinkhorn, is also a native of Britain, and found in woods and on banks. It arises from the earth under a veil or volva, shaped exactly like a hen's egg, and of the same colour, having a long fibrous radicle at its base. This egg-like volva is composed of two coats or membranes, the space between which is full of a thick, viscid, transparent matter, which, when dry, glues the coats together, and shines like varnish. In the next stage of growth, the volva suddenly bursts into several lacerated permanent segments, from the centre of which arises an erect, white, cellular, hollow stalk, about five or six inches high and one thick, of a wax-like friable substance, and most fetid cadaverous smell, conical at each end, the base inserted in a white, concave, membranaceous turbinated cup, and the summit capped with a hollow, conical pileus, an inch long, having a reticulated cellular surface, its base detached from the stalk, and its summit umbilicated, the umbilicus sometimes perforated and sometimes closed. The under side of this pileus is covered with a clear, viscid, gelatinous matter, similar to that found between the membranes of the volva; and under this viscid matter, concealed in reticulated receptacles, are found the seeds, which when magnified appear spherical. As soon as the volva bursts, the plant begins to diffuse its intolerable odours, which are so powerful and widely expanded, that the fungus may be readily discovered by the scent only, before it appears to the sight. At this time, the viscid matter between the coats of the volva grows turbid and fuscous; and when the plant attains its full maturity, the clear viscid substance in the pileus becomes gradually discoloured, putrid, and extremely fetid, and soon afterwards turns blackish, and, together with the seeds and internal part of the pileus itself, melts away. The fetid smell then begins to remit, the fungus fades, and continues for a short time sapless and coriaceous, and at last becomes the food of worms. The cadaverous scent of this fungus greatly allures the flies; which, lighting upon the pileus, are entrapped in the viscid matter, and perish. We are informed by Gleditsch, that the vulgar people in Thuringia call the unopened volva by the ridiculous name of *ghosts* and *demon's eggs*; and that they collect and dry them either in the smoke or open air, and when reduced to powder, use them in a glass of spirits as an aphrodisiac.

PHALLUS, among the Egyptians, was the emblem of fecundity. It was very fervently worshipped by women, especially by those who were barren. This custom was introduced among the Greeks, and festivals in honour of it were called *phalica*. See MYSTERIES, n° 38, &c. Among the Hindoos a similar emblem called *lingam* is used, and for similar purposes. See HINDOOS, n° 4.

PHALTI, or **PHALTIEL**, son of Laish. He married

Phallus,
Phaltis.

Phanatic
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Phaon.

ried Michal, after Saul had taken her from David; but David afterwards took her away from Phalti (1 Sam. xxv. 44. 2 Sam. iii. 15.) Some interpreters are of opinion Phalti did not meddle with Michal all the time she continued in his house, for fear that both of them should incur the penalty of death, to be inflicted on adulterers (Levit. xx. 10.), because Michal had not been legally divorced; but these reasons are frivolous. Saul looked upon David as a rebel to his king, and an outlaw, whose goods and wives belonged to him, and which he could absolutely dispose of. He would not have given Michal to Phalti, nor would he have received her, if he had not thought he might use her as his wife. If Michal had no children by Phalti, by whom then were those children that the Scripture says she had, since it is known she had none by David? See 2 Sam. xxi. 8. and vi. 23.

PHANATIC, or FANATIC, a visionary; one who fancies he sees spectres, spirits, apparitions, or other imaginary objects, even when awake; and takes them to be real. See PHANTASY and FANATIC.

Such are phrenetics, necromancers, hypochondriac persons, lycanthropi, &c. See PHRENETIC, HYPOCHONDRIAC, LYCANTHROPI.

Hence the word is also applied to enthusiasts, pretenders to revelation, new lights, prophecies, &c. See ENTHUSIAST, and SECOND Sight.

PHANTASIA was the daughter of Nicarchus of Memphis in Egypt. It has been supposed that she wrote a poem on the Trojan war, and another on the return of Ulysses to Ithaca, from which compositions Homer copied the greatest part of his Iliad and Odyssey, when he visited Memphis, where they were deposited.

PHANTASM, a term sometimes used in a synonymous sense with idea, or notion retained in the mind, of an external object.

PHANTASY, or FANCY, the *Imagination*; the second of the powers or faculties of soul, by which the species of objects received by the external organs of sense are retained, recalled, further examined, and either compounded or divided. See IMAGINATION; and METAPHYSICS, Part I. Chap. ii.

Others define the phantasy to be that internal sense or power, whereby the ideas of absent things are formed, and represented to the mind as if they were present. In melancholics and madmen this faculty is very strong, representing many extravagant and monstrous things, and framing its images as lively as those of sensation: whence the visions and deceptions those persons are liable to.

PHANUEL, of the tribe of Asher, the father of a holy widow and prophets called Anna, who was in the temple when our Saviour was presented there by his parents (Luke ii. 36, 37, 38.)

PHAON, a young man of Mytilene, in the island of Lesbos, received from Venus, as fable reports, an alabaster vase filled with an essence which had the virtue of conferring beauty. He had no sooner anointed his body with it than he became the most beautiful of men. The ladies of Mytilene fell desperately in love with him; and the celebrated Sappho threw herself down a precipice because he would not encourage her passion. He is said to have been killed by a husband who surprised him with his wife. We have in Ovid a

letter from Sappho to Phaon, which Mr Pope has translated into English verse.

PHARA (anc. geog.), a village between Egypt and Arabia Petræa; or, according to Ptolemy, at a promontory situated between the Sinus Heroopolites and Elaniticus of the Red Sea; where Ismael is said to have dwelt. In Hebrew it is *Paran*, and in most interpreters; *Pharan*, Septuagint and Vulgate. *Pharanite*, the people (Ptolemy.) *Paran* or *Pharan*, the name of the wilderness in its neighbourhood, adjoining to Kadesh.

PHARÆ (anc. geog.), a town of Achaia in Peloponnesus, on the river Pierus, 70 stadia from the sea, and to the south of Patræ 150 stadia. Another, of Crete (Pliny); a colony from the *Pharæ* of Messenia (Stephanus.) A third *Pharæ*, or *Pheræ* (Strabo, Ptolemy); *Pharæ*, æ, (Polybius); a town of Messenia, on the river Nedo (Strabo); on the north side of the Sinus Messenius, and to the north-west of Abea. Anciently read *Pharis* in Homer (Pausanias, Statius), though now read *Pharæ*. *Pharite* is the name of the people.

PHARAMOND is the name which is given by the generality of historians to the first king of France. He is said to have reigned at Treves, and over a part of France, about the year 420; and to have been succeeded by his son Clodion: but the account which is given of these two princes is very uncertain. It is probable Pharamond was properly no more than a general of an army, the head of a military society of Franks, who were masters of their persons and their fortunes. Gregory of Tours seems to have been of this opinion. "It is not generally known (says he) who was the first king of the French. Sulpitius Severus, who mentions several things respecting that nation, takes no notice of its first monarch; he only says that it had generals." Be that as it may, the institution of the famous Salique law (so named from the Salians, the most illustrious of the Franks) is generally attributed to Pharamond. "This law fixed the punishment of crimes, and various points of police. There is no just ground for believing that it expressly settled the right of succession to the crown: it only says, that, with relation to the Salic land, women have no share of heritage, without restricting it to the royal family in particular; for all those were generally called *Salic lands* which were held by right of conquest; and it is easy to conceive that a nation of soldiers, whose general was their king, would not submit to be governed by a woman. A long custom, supported by the principles of the nation, came in time to be the established law of the kingdom." (See *M. Abbé Millot, Elem. de l'Histoire de France*, tom. i.)

PHARAOH, a common name of the kings of Egypt. Josephus says, that all the kings of Egypt, from Minæus the founder of Memphis, who lived several ages before Abraham, have always had the name of Pharaoh, down to the times of Solomon, for more than 3300 years. He adds, that in the Egyptian language the word *Pharaoh* signifies a king; and that those princes did not assume this name but when they ascended the throne, at which time they quitted also their former name. From hence it comes to pass,

Phara
||
Pharaoh.

Pharaoh. says Josephus, that Herodotus names none of the kings of Egypt after Minæus the builder of Memphis, though he had 330 kings for his successors, because they had all the name of Pharaoh; but because this name did not pass to women also, he names an Egyptian queen Nicaule who succeeded them. Lastly, I find, adds Josephus, from the ancient records of our nation, that from the age of Solomon no king of Egypt had any longer the name of Pharaoh.

But Josephus is not very accurate in this passage. True it is, Herodotus says, that Mines, or Minæus, was the first king of Egypt, and founder of Memphis; that there were 330 kings after him in Egypt; that after them there was a queen called Nicotris, and not Nicaule, as Josephus writes it; but it is not true that these kings had no other name but Pharaoh. Herodotus says expressly, that in the books of the Egyptian priests were read the names and the catalogue of 330 kings; that in this number of 330 there were 18 Ethiopians, and a woman that was a foreigner called Nicotris, and that all the others were Egyptians. These princes therefore had every one his proper name mentioned in the catalogue of the Egyptian kings. So likewise we see in the fragments of Manetho, that every king of Egypt had a name peculiar to him; and we find the name Pharaoh only in Scripture.

What Josephus adds concerning queen Nicaule, or Nicotris, whom he pretends to be the same as the queen of Sheba, of whom mention is made in Scripture (1 Kings x. 1, 2, &c.), is entirely fabulous; and as to what he says, that since the time of Solomon the kings of Egypt have no longer had the name of Pharaoh, is manifestly false, since we still find this name in the second book of Kings, under Hezekiah (2 Kings xvlii. 21.); under Josiah (xxiii. 29, 30, 33, &c.), where this name is joined to Necho, which was the proper name of this prince; under Jehoiakim (xxiii. 35.); and in the prophets Isaiah, Jeremiah, and Ezekiel, who are much later than Solomon. It is very probable that the Egyptians gave the name of Pharaoh to their kings as long as the Egyptian language was in common use, and as long as their kings were of their own nation: but after the conquest of Egypt by Alexander the Great, and that the Grecians introduced their language with their government, the name of Pharaoh was known no longer among them. The first prince known to us by the name of Pharaoh was he in whose time Abraham went down to Egypt, when Sarah, who passed only for Abraham's sister, was by the command of Pharaoh brought to his palace in order to become his wife. See ABRAHAM. But the Lord smote Pharaoh and his family with great infirmities, and gave him to know that she was Abraham's wife; whereupon Pharaoh sent for Abraham, restored him his wife, and at the same time gave orders that he should be conducted out of Egypt, with every thing that belonged to him. See SARAH.

The second Pharaoh spoke of by the Scripture is he that reigned when Joseph arrived there. This prince or his successor had the mysterious dream of the fat and lean kine, and the seven full and barren ears of corn, which Joseph explained so well to his satisfaction, that he made him governor of his house and of all Egypt, reserving only to himself the name of a king. This is the same Pharaoh that sent for and

entertained the patriarch Jacob and his family in Egypt, and gave them the land of Goshen for their habitation. See JOSEPH and JACOB.

The third Pharaoh known in holy writ is he that persecuted the Israelites. Moses tells us that he was a new king, and had no knowledge of Joseph (Exod. i. 8.) This prince, observing that the Israelites were become very numerous and powerful, resolved to depress them by hardship and labour; and set cruel and pitiless taskmasters over them. But the more he oppressed them, the faster they multiplied; insomuch that he gave orders to the Egyptian midwives, who assisted the Hebrew women in their labour, to put all the male children to death, and to save alive the females only. But this command was not strictly executed. The midwives feared the Lord, and preserved alive not only the female children, but the males also.

Pharaoh, seeing this project did not succeed to his wishes, published a decree (Exod. i. 22.) that all the male children born of Hebrew women should be thrown into the Nile, and that only the females should be spared. This order was rigorously executed; yet by the providence of God Moses was preserved, and even brought up in Pharaoh's own court, by his own daughter, who by chance had found the child, as he was exposed upon the Nile.

Moses being grown up, and having killed an Egyptian who had abused an Hebrew, was obliged to fly from Egypt to avoid that death that Pharaoh had threatened him with.

Several years after, being about 80 years old, he returned again by an order from God, and performed mighty miracles before Pharaoh. See MOSES. There is a good deal of probability that this Pharaoh before whom Moses appeared, and in whose sight he smote Egypt with so many plagues, was a different person from him who would have laid hands on him after he had slain the Egyptian. This same Pharaoh having at last been compelled to send away the Hebrews, and to suffer them to go out of Egypt, soon repented of the leave he had given, and pursued them at the head of his army with his chariots. But he was drowned in the Red Sea, wherein he had rashly entered in the eagerness of his pursuit. Some historians pretend to give us the name of this Pharaoh; some, as Appion, call him Amosis or Amasis; Eusebius calls him Chenchris; Usher calls him Amenophis; but we may assure ourselves that there can be nothing certain in all this.

The fifth Pharaoh known to us is he that gave protection to Hadad son of the king of Edom, who gave him to wife the sister of his own queen, enriched him with lands, and brought up his son Genubah in his own court. Hadad returned to Idumea after the death of David.

The sixth Pharaoh is he that gave his daughter in marriage to Solomon king of the Hebrews (1 Kings iii. 1.); and having taken Gezer, he set it on fire, drove the Canaanites out of it, and gave it for a present to Solomon, in lieu of a dowry for his daughter, whom he had married to this prince (1 Kings ix. 16.)

The seventh is Shishak, who entertained Jeroboam in his dominions, a rebellious subject of Solomon, and offered him a refuge in opposition to the king his master. The same Shishak declared war against Rehoboam the son and successor of Solomon, besieged and took

Pharaon. took Jerusalem, carried away all the king's treasures, and those of the house of God, and particularly the golden bucklers that Solomon had made. See SHISHAK.

The eighth is that Pharaoh with whom Hezekiah made a league against Sennacherib king of Assyria, in the year of the world 3290. See SENNACHERIB. This Pharaoh is probably the same whom Herodotus names Sethon, priest of Vulcan, who came to meet Sennacherib before Pelusium, and to whose assistance Vulcan sent an army of rats, which gnawed the bow-strings and the thongs of the bucklers of Sennacherib's soldiers.

The ninth is Pharaoh-Necho, or Nechos, son of Psammiticus, who made war with Josiah, and subdued him. Herodotus also mentions this prince. See NECHO, and EGYPT, n° 11.

The tenth is Pharaoh Hophrah, who entered into an alliance with Zedekiah king of Judah, and attempted to come to his assistance against Nebuchadnezzar king of Chaldea. It was against this Pharaoh that Ezekiel pronounced several of his prophecies (See Ezek. xxix. xxx. xxxi. xxxii.) He is called Apries in Herodotus, l. ii. c. 161. He is also mentioned in Habakkuk ii. 15, 16. See also Isaiah xix. xx. and Jeremiah xlvi. 16, &c. See APRIES, and EGYPT, n° 13, &c.

PHARAON is the name of a game of chance, the principal rules of which are: the banker holds a pack consisting of 52 cards; he draws all the cards one after the other, and lays them down alternately at his right and left hand; then the ponte may at his pleasure set one or more stakes upon one or more cards, either before the banker has begun to draw the cards, or after he has drawn any number of couples. The banker wins the stake of the ponte when the card of the ponte comes out in an odd place on his right hand, but loses as much to the ponte when it comes out in an even place on his left hand. The banker wins half the ponte's stake when it happens to be twice in one couple. When the card of the ponte being but once in the stock happens to be the last, the ponte neither wins nor loses; and the card of the ponte being but twice in the stock, and the last couple containing his card twice, he then loses his whole stake. De Moivre has shown how to find the gain of the banker in any circumstance of cards remaining in the stock, and of the number of times that the ponte's cards is contained in it. Of this problem he enumerates four cases, viz. when the ponte's card is once, twice, three, or four times in the stock. In the first case, the gain of the banker is $\frac{1}{n}$, n being the number of cards in the stock.

In the second case, his gain is $\frac{n-2 \times y}{n \times n-1} + \frac{2}{n \times n-1}$, Pharez, Pharisees.

or $\frac{\frac{1}{2}n+1}{n \times n-1}$, supposing $y = \frac{1}{2}$. In the third case, his

gain is $\frac{3y}{2 \times n-1}$, or $\frac{3}{n \times n-1}$, supposing $y = \frac{1}{2}$. In

the fourth case, the gain of the banker, or the loss of the ponte, is $\frac{2n-5}{n-1 \times n-3} y$, or $\frac{2n-5}{2 \times n-1 \times n-3}$, supposing $y = \frac{1}{2}$. De Moivre has calculated a table, exhibiting this gain or loss for any particular circumstance of the play; and he observes, that at this play the least disadvantage of the ponte, under the same circumstances of cards remaining in the stock, is when the card of the ponte is but twice in it, the next greater when three times, the next when once, and the greatest when four times. He has also demonstrated, that the whole gain *per cent.* of the banker, upon all the money that is adventured at this game, is 2 l. 19 s. 10 d. See De Moivre's Doctrine of Chances, p. 77, &c. p. 105, &c.

PHAREZ, son of Judah and Tamar (Gen. xxxviii. 27, 28, &c.) Tamar being just ready to lie in, found herself with child of twins. One of them appeared first, and putting his arm out, he immediately drew it back again. The midwife tied a scarlet thread upon his arm, to distinguish him for the first-born: but having withdrawn his hand, his brother got before him into the world: whereupon he was called by his mother Pharez, i. e. *one breaking forth*; as the other with the thread on his hand was called Zarah. The sons of Pharez were Hezron and Hamul (Numb. xxvi. 20, 21.) F. Calmet, upon this article, explains the text as if Pharez, and not Zarah, had put out his hand, and drew it in again.

PHARISEES, a famous sect of the Jews, who distinguished themselves by their zeal for the traditions of the elders, which they derived from the same fountain with the written word itself; pretending that both were delivered to Moses from Mount Sinai, and were therefore both of equal authority. From their rigorous observance of these traditions, they looked upon themselves as more holy than other men: and therefore separated themselves from those whom they thought sinners or profane, so as not to eat or drink with them; and hence, from the Hebrew word *pharis*, which signifies "to separate," they had the name of *Pharisees* or *Separatists*.

This sect was one of the most ancient and most considerable among the Jews; but its original is not very well known (A): however, it was in great repute in the

(A) The Jesuit Serrarius places their first rise about the time of Esdras; because it was then that the Jews first began to have interpreters of their traditions. Maldonat, on the other hand, will not have this sect to have arisen among the Jews till a little before the time of Christ. Others, perhaps with more probability, refer the origin of the Pharisees to the time of the Maccabees.

Dr Lightfoot thinks, that Pharisaism rose up gradually, from a period which he does not assign, to the maturity of a sect. It is certain, from the account given by Josephus, that in the time of John Hyrcanus, the high priest and prince of the Asmonean line, about 108 years before Christ, the sect was not only formed, but made a considerable figure; and that it had advanced to a high degree of popularity and power about 80 years before Christ. Jos. Ant. lib. xiii. cap. 10. § 5, 6. cap. 15. § 5. & cap. 16. § 1. According to Basnage's Hist. of the Jews, book ii. cap. 9. § 2. one Aristobulus, an Alexandrian Jew, and a Peripatetic philosopher, who

Pharisee. the time of our Saviour; and must have had its original at the same time with the traditions, and they grew up together, till at length they had gained ground so far, that the traditional law swallowed up the written, and these who were propagators of it the whole bulk of the Jewish nation.

The extraordinary pretences of the Pharisees to righteousness drew after them the common people, who held them in the highest esteem and veneration. Our Saviour frequently, however, charges them with hypocrisy, and making the law of God of no effect through their traditions (Matt. ix. 2. xv. 1—6. xxiii. 13—33, and Luke xi. 39—52.) Several of these traditions are particularly mentioned in the gospel; but they had a vast number more, which may be seen in the Talmud, the whole subject whereof is to dictate and explain those traditions which this sect imposed to be believed and observed.

The Pharisees, contrary to the opinion of the Sadducees, held a resurrection from the dead, and the existence of angels and spirits (Acts xxiii. 8.) But, according to Josephus, this resurrection of theirs was no more than a Pythagorean resurrection, that is, of the soul only, by its transmigration into another body, and being born anew with it. From this resurrection they excluded all that were notoriously wicked, being of opinion that the souls of such persons were transmitted into a state of everlasting woe. As to lesser crimes, they held they were punished in the bodies which the souls of those who committed them were next sent into.

Josephus, however, either mistook the faith of his countrymen, or, which is more probable, wilfully misrepresented it, to render their opinions more respected by the Roman philosophers, whom he appears to have on every occasion been desirous to please. The Pharisees had many pagan notions respecting the soul; but Bishop Bull, in his *Harmonia Apostolica*, has clearly proved, that they held a resurrection of the body, and that they supposed a certain bone to remain uncorrupted, to furnish the matter of which the resurrection body was to be formed. They did not, however, believe that all mankind were to be raised from the dead. A resurrection was the privilege of the children of Abraham alone, who were all to rise on Mount Zion; their incorruptible bones, wherever they might be buried, being carried to that mountain below the surface of the earth. The state of future felicity, in which the Pharisees believed, was very gross: They imagined, that men in the next world, as well as in the present, were to eat and drink, and enjoy the pleasures of love, each being reunited to his former wife. Hence the Sadducee, who believed in no resurrection, and supposed our Saviour to teach it as a Pharisee, very shrewdly urged the difficulty of disposing of the woman who had in this world been the wife of seven husbands. Had the resurrection of Christianity been the Pharisaical resurrection, this difficulty would have been in-

surmountable; and accordingly we find the people, Pharisees and even some of the Pharisees themselves, struck with the manner in which our Saviour removed it.

This sect seems to have had some confused notions, probably derived from the Chaldeans and Persians, respecting the pre-existence of souls; and hence it was that Christ's disciples asked him concerning the blind man (John ix. 2.), 'Who did sin, this man or his parents, that he was born blind?' And when the disciples told Christ, that some said he was Elias, Jeremias, or one of the prophets (Mat. xvi. 14.), the meaning can only be, that they thought he was come into the world with the soul of Elias, Jeremias, or some other of the old prophets, transmigrated into him. With the Essenes, they held absolute predestination; and with the Sadducees free-will; but how they reconciled these seemingly incompatible doctrines is nowhere sufficiently explained. The sect of the Pharisees was not extinguished by the ruin of the Jewish commonwealth. The greatest part of the modern Jews are still of this sect; being as much devoted to traditions or the oral law as their ancestors were. See the articles CABBALISTS, CARAITES, ESSENES, SADDUCEES, &c.

PHARMACA, among the ancients, meant medicated or enchanted compositions of herbs, minerals, &c. some of which, when taken inwardly, were supposed to cause blindness, madness, love, &c. others infected by touch; such was the garment sent by Medea to Creusa, prepared *secundum artem*; and others operated upon persons at a distance. *Pharmaca foteria* were employed as antidotes against these mischievous compositions: Thus the herb moly preserved Ulysses from the magical influence of Circe. The laurel, the rhamnus, the flea-bane, the jasper-stone, were used for similar purposes. See *Potter's Grec. Ant.*

PHARMACI, were two persons who were employed in the lustration or purification of cities. Some say they were both men; but others maintain, that a man to represent the males, and a woman to represent the females, performed this office. They performed sacrifice, and wore figs about their necks called *ολλυδεις*, those of the man were blackish, and those of the woman white. Figs were an emblem of fertility, which they doubtless prayed for on these solemn occasions.

PHARMACOCHEMIA, means that part of the chemical art which treats of the preparation of medicines. It is so named by way of distinction from that chemistry which is wholly employed about the transmutation of metals by means of the philosopher's stone; this being called *spagirico-chemia*.

PHARMACOLOGY, is a treatise of medicines, or the art of preparing them, judging of them, &c.

PHARMACOPŒIA (from *φάρμακον* remedy, and *ποιειν* to make), means a dispensatory, or a treatise describing the preparations of the several kinds of medicines, with their uses, manner of application, &c.

We have various pharmacopœias, as those of Bauderon, Quercetan, Zwelfer, Charas, Bates, Salmon, Lemery,

who flourished about 125 years before Christ, and wrote some allegorical commentaries on the scripture, was the author of those traditions by an adherence to which the Pharisees were principally distinguished from other sects.

Pharmacopola. Lemery, Lewis, &c. The latest and most in esteem are the Edinburgh and London dispensatories See PHARMACY.

PHARMACOPOLA, or PHARMACOPŒIUS, an *apothecary*; or a person who prepares and sells medi-

cines. (See APOTHECARY). The word is seldom used but by way of ridicule. It is formed from *φάρμακον* and *πωλιν*, to sell. See Horace, Satire 2. lib. i. ver. 1.

PHARMACUM, *φάρμακον*, a medicament or medicine; whether of a salutary or poisonous quality.

Pharmacum.

P H A R M A C Y.

Definition and division of pharmacy.

PHARMACY(A); is the art of preparing, preserving, and compounding substances, for the purposes of medicine. This art has been commonly divided into two branches, *Galenical* and *Chemical* pharmacy. But for this division there is no foundation in nature: and accordingly processes in one pharmacopœia referred to the head of Chemical, are in another referred to the head of Galenical. There can be no doubt, that even the most simple pharmaceutical preparations are to a certain extent chemical. Hence this division, founded on prejudice, and supported merely by a veneration for antiquity, is now banished from almost every modern pharmacopœia.

Pharmacy has also been divided into *Theoretical* and *Practical*; the first, consisting not merely of speculative opinions, but of a knowledge of facts and principles, tending to explain the *rationale* of processes; the latter, comprehending the mere manual labour employed in processes.

The former of these may therefore be justly styled

Scientific Pharmacy. And there can be no doubt that an acquaintance with it is essentially necessary to the physician as well as the apothecary: for without it he must often err in the forms of preparations and compositions which he employs; and must be often deceived in the effects resulting from compositions, when he infers their properties from the known powers of the ingredients in their separate state.

The theory of pharmacy therefore is the same with that of chemistry; as are also the operations, which remain to be discussed here only in as far as they are made subservient to the medicinal art, distinct from that which is purely chemical. The objects of pharmacy, however, are much more limited than those of chemistry; the latter comprehending, in the utmost latitude of the word, almost every substance in nature; while pharmacy regards only such bodies in the vegetable, animal, and mineral kingdoms, as, by their effects on the human frame, tend to preserve health, or to restore it when lost.

Objects of pharmacy.

PART I. ELEMENTS OF PHARMACY.

CHAP. I. A general View of the Properties and Relations of Medicinal Substances.

SECT. I. VEGETABLES.

Analogy between vegetables and animals.

VEGETABLES are organized bodies, furnished with a variety of vessels for reception, transmission, and perspiration of different fluids. Analogous to animals, they are produced from seeds and eggs, and are endowed with functions, by which the aliment they imbibe is changed into new forms, into solids and fluids, peculiar to particular plants, and to different parts of the same plant.

The analogy between the vegetable and animal kingdoms will appear still more striking, when we consider that the former exhibit, though in a less degree, all the phenomena of sensibility and motion.

Pabulum of vegetables.

The *pabulum* of vegetables, like that of most animals, is of a mixed nature; and is composed of the necessary union of water, heat, and light, and less necessarily of air and earth: the office of these two last

elements seems to be that of filters, or vehicles for conveying the other principles in proper form.

From varieties in the state and proportion of these several agents, a very multiplied diversity takes place in the external form, quantity, and quality, of one and the same vegetable: hence the difference of plants from the soil, climate, season, and other similar circumstances. The influence of heat and light, or what is probably the same thing, the absorption of the inflammable principle, is perhaps the most important article in the aliment of vegetables. This principle, whether derived from the solar rays, from putrid matters employed in manure, or from the putrefaction of the wild growth, assisted by calcareous earths and other septics, is found at all times to modify, in a peculiar manner, the form, the quantity, and even the sensible and inherent properties, of vegetables. It is of importance however to remark, that the soundness and specific principles of vegetables are not invariably the more complete in proportion to the vigour of their growth; high health, which is always a dangerous state in the constitution of animals, is often the means

Influence of soil, climate, heat, and light, on vegetables.

(A) For this article we are indebted to the liberality of Mr Creech bookseller in Edinburgh, who, with his well known zeal for the cultivation of science, and, regardless of the advantage to be expected from his copy-right, has permitted us to insert into this work the third and much improved edition of the Edinburgh New Dispensatory.

Elements. means of perverting or destroying the economy of vegetable life. Thus the finer aromatics, which naturally inhabit the dry and sandy soils, when transplanted into a moist and rich one, or, in other words, when placed in mould abounding with the *fomites* of inflammable principle, grow with rapidity and vigour, and have their bulk considerably increased; but lose very much of their fragrance, as if their active principles were exhausted by the luxuriance of their growth.

6
Plants differ in the different periods of their growth.

Plants are also found to differ considerably in the different periods of their growth. Thus, some herbs in their infancy abound most with odoriferous matter; others again yield little or none till they have attained to a more advanced age. Many fruits, in their immature state, contain an austere acid juice, which by maturation is changed into a sweet one: others, as the orange, are first warm and aromatic, and afterwards by degrees become filled with a strong acid. The common grain, and sundry other seeds, when beginning to vegetate, are in taste remarkably sweet: yet the kernels of certain fruits prove, at the same period, extremely acid. The roots of some of our indigenous plants, whose juice is, during the summer, thin and watery, if wounded early in the spring, yield rich balsamic juices, which, exposed to a gentle warmth, soon concrete into solid gummy-resins, superior to many of those brought from abroad. In open exposures, dry soils, and fair warm seasons, aromatic plants become stronger and more fragrant, while those of an opposite nature become weaker. To these particulars, therefore, due regard ought to be had in collecting plants for medicinal uses.

7
Different parts of the same plant of different qualities from each other.

It may be proper to observe also, that the different parts of one plant are often very different in quality from each other. Thus the bitter herb wormwood rises from an aromatic root; and the narcotic poppy-head includes seeds which have no narcotic power. These differences, though very obvious in the common culinary plants, do not seem to have been sufficiently observed or attended to, in those plants that have been admitted as articles of the materia medica.

8
Vegetables obnoxious to disease and death.

Without any obvious dependence on the circumstances above-mentioned, vegetables are, like animals, also obnoxious to diseases and death; which, whether occasioned by intense cold, by insects, lightning, or other causes, always maintain a striking analogy to the affections of animals. The principal difference between animals and vegetables is, that the several parts of vegetables do not constitute such a mutually depending system as those of the more perfect animals: Hence it is, that a very considerable part of a plant may be diseased or dead, while the rest enjoys perfect good life and health. Though the physiology of vegetables is hitherto insufficient for forming any complete doctrines of the causes and cure of their several diseases; yet, in many cases, it might be useful to attend to the formation of a pathology of the vegetable kingdom: in the state even of our present knowledge, it is of importance in the study of pharmacy to be aware that such diseases really exist, and are capable of changing or destroying the active principles of many of our most valuable herbs. In the plants more evidently sensitive, the diseases exhibit a very

close analogy to many of those of animals: several of the remote causes are such as are known to obstruct perspiration, to induce general debility, or otherwise disorder the animal economy. The diseases also are evidently marked by a diminution of their sensitive and moving principle; and perhaps, in consequence of this diminution, their solids, their sap, and other fluids, shrivel and decay, and the whole plant assumes new forms, and is impregnated with inert, or fraught with noxious principles. Analogous also to animals, the plant, when deprived of the living principle, runs into all those changes common to what is called *inanimate matter*. We shall now proceed to examine the changes to which vegetables are subject.

I. Productions from Vegetables by FERMENTATION.

Fermentation is a spontaneous motion excited in dead vegetables and animals, which is peculiar to those organic substances in consequence of the principle of vegetable or animal life. See FERMENTATION.

The circumstances favouring fermentation are in general, a certain degree of fluidity, a certain degree of heat, and the contact of the air.

There are, however, several substances, of themselves not susceptible of fermentation, which nevertheless may be brought into that state by the admixture of those that are; as by adding to them, along with a proper quantity of water, a portion of the yeast or head thrown up to the surface of fermenting liquors. Without this expedient many vegetables would run immediately into the acetous, and some of them into the putrefactive, fermentations. It is also found, that though acetous and putrefactive ferments are unable to stop the vinous fermentation, they are however capable of assimilating the liquor to their own nature in a more perfect form: and hence it is, that in the manufactures of wine, rum, and vinegar, it is found useful to keep the vessels well seasoned with the liquor intended to be prepared. Three different kinds or stages of fermentation have been generally distinguished by chemists. The vinous, which furnishes alcohol, or what is commonly called *spirit*; the acetous, which affords vinegar; and the putrefactive, which yields volatile alkali. Being generally constant in succession to each other, the whole process will be best understood by considering each of them apart. All vegetable substances are not capable of the vinous fermentation: the conditions necessary to its production are, a saccharo-mucilaginous matter; a fluidity somewhat viscous, the proper degree of which is best learned from experience; a heat from 40 to 96 of Fahrenheit's thermometer; a considerable mass of matter; and the access of the external air.

The phenomena exhibited in the vinous fermentation are, a brisk tumultuary motion, the liquor loses its transparency and homogeneous appearance, its bulk and heat are considerably increased, the solid parts are buoyed up to the top, and a great quantity of a permanently elastic fluid is disengaged. This fluid or gas being heavier than atmospheric air, floats in separate masses near the surface of the liquor; and is easily distinguishable from common air by extinguishing flame and animal life, precipitating lime from limewater, crystallising and rendering mild the caustic

Elements.
12
Carbonic
acid.

caustic alkali: is the gas sylvestre of Helmont, and the fixed air, aerial acid, or carbonic acid of modern chemists. After some time the tumultuary motion in the liquor is suddenly checked, perhaps from the generation of the alcohol; a fine ley is also precipitated; and the floating matter, if not purposely prevented, subsides to the bottom of the vessel. In the wines produced from the grape, a large quantity of saline concrete is incrustated on the sides and bottom of the casks; and this is commonly known by the name of *tartar*, the properties of which we shall afterwards examine. At the termination of these phenomena, the vegetable matter has assumed new properties; and from being a mild, sweet, or gently acidulous infusion, is now become the brisk, pungent, and inebriating liquor, called *wine* or *vinous liquor*.

13
Wines, various kinds of.

Fermented or vinous liquors are prepared from a great variety of substances: the saccharine substances, or those rendered so by a beginning vegetation, are in general fittest for the purpose; a multitude of collateral circumstances are also necessary for the proper management of the process; and in vinous liquors great diversities are observable. These differences are not only observable in wines produced from different substances, but also in those prepared from one and the same vegetable. These diversities may be referred to the different conditions of the substance to be fermented, to the states of fluidity and heat, and to the degree of fermentation to which the subject has been carried. This last is principally modified by the preceding causes, and not unfrequently by very minute and apparently trifling circumstances in the conduct of the operator. Hence the numerous varieties in the vinous liquors produced from the grape, which have been more peculiarly denominated *wines*. It is an important part of pharmacy to inquire into these differences with care and attention.

The diversity in vinous liquors is still more obvious in those produced from different vegetables. Many of the native qualities of the substances, as colour, taste, flavour, &c. often remain in the wine; not being totally subdued by that degree of fermentation necessary for rendering the liquor vinous. Hence the remarkable difference of wines produced from the grape and the graminous seeds: the wine produced from these last has been more strictly called *beer*; and is well known to differ from wines produced from apples, pears, apricots, or any other fruit.

1. Of the Product of the VINOUS Fermentation.

14
Product of vinous fermentation.

The product of all these fermented vegetables is, as we have just now mentioned, the pungent and intoxicating liquor called *wine*. It is proper, however, in pharmacy, to inquire into the different principles which enter its composition. As the wine furnished by grapes is the most valuable and generally known, we shall take it as an example; Grape-wine, then, is composed of a large quantity of water, of alcohol, of tartar, and of a colouring matter. It is proper, however, that we should lay down the proofs of such a combination in wine, and explain the methods by which it may be decomposed and separated into the constituent parts above-mentioned.

For this purpose, recourse is generally had to the

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assistance of the fire. The liquor is put into an alembic; and as soon as it boils, a white milky fluid, of a pungent smell and taste, distils into the recipient. This fluid is called *aquavite*, or, in common language, *spirit*: it is compounded of water and certain matters capable of suspension in water, of alcohol, and of a small proportion of oil; which last communicates to it a milky colour: the yellow colour, afterwards assumed, is partly owing to the same oil, and partly to a solution of the extractive matter of the wooden casks in which the *aquavite* has been kept. This *aquavite*, like wine, always partakes more or less of the flavour of the vegetable from whence it has been prepared; but by farther distillation, and other processes, it is freed of its water, and of the native principles of the vegetable matter which the watery parts had kept in solution; when thus prepared, it is a pure *alcohol* or *inflammable spirit*, which is always the same from whatever vegetable the wine was produced.

After all the *aquavite* has been drawn off, the residuum now ceases to be wine; it is of a chocolate colour, of an acid and austere taste; it has now assumed a heterogeneous appearance, and a great quantity of saline crystals is observed in the liquor; these crystals are the *tartar*. By the above processes, then, we have fully decomposed *wine*: but it is to be observed, that by this analysis we have not separated the different parts of wine in their original and entire state; nor are we hitherto acquainted with any method of regenerating the wine by recombining the *aquavite* with the residuum: some product of the fermentation is therefore changed or destroyed; and this product is probably some peculiar modification of fixed air or aerial acid. The residuum, when evaporated, assumes the form and consistence of an extract; the colouring part may be abstracted by rectified spirit of wine, but is not separable from it by the addition of water: it seems therefore to be of a gummi-resinous nature, and extracted from the grape by means of the alcohol generated during the fermentation.

From this analysis, then, it is obvious, that wine is composed of water, colouring matter, alcohol, and something that is changed or lost. We shall refer the particular examination of alcohol and tartar to the proper places assigned them in this work; and we hope that from this general survey of the subject, the properties of wine, as a solvent of several medicinal substances to be afterwards examined, will be much more readily understood. Before we go farther, it is proper to add, that the *ley* precipitated from wine during fermentation, is a compound of stones, pieces of grape, tartar, and vitriolated tartar: the two first are inert bodies; the two last we shall particularly examine in their proper order. We are now prepared to consider the nature and product of the next kind or stage of fermentation, viz. the

2. ACEROUS Fermentation.

To understand the process of the acetous fermentation, we must leave for the present our analysis of the product of the vinous fermentation, and return to the wine in its most perfect and entire state. It is proper to observe, that though, after the liquor has become vinous, a partial cessation of the more obvious

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phenomena

Elements.

15
Water, colouring matter, alcohol, &c.

16
Process of acetous fermentation.

Elements.

Elements.

phenomena takes place, yet the wine still suffers a slow and imperceptible degree of fermentation. We are not then to consider the liquor as being in a quiescent state, but as constantly approaching to the next stage, viz. the *acetous fermentation*, which we are now to consider. This kind of insensible fermentation, or what we may call the intermediate change, seems to be necessary to the perfection of the wine. Its degree, however, is to be regulated under certain limitations: when too much checked, as by cold, thunder, or such like causes, the wine becomes vapid; when too much encouraged by heat, contact of air, &c. it approaches too far to the acetous change: but in order that the vinous shall proceed fully to the acetous fermentation, several circumstances are required; and these are in general the same that were before necessary to the vinous stage. These conditions are, a temperate degree of heat, a quantity of unfermented mucilage, an acid matter, such as tartar, and the free access of external air. When thus situated, the liquor soon passes into the acetous fermentation: but during this stage the phenomena are not so remarkable as in the vinous; the motion of air is now less considerable, a gross unctuous matter separates to the bottom, the liquor loses its vinous taste and flavour, becomes sour, and on distillation affords no inflammable spirit. It is now the acetous acid or vinegar; and when separated by distillation from the unctuous ley, may be preserved a considerable length of time without undergoing the putrid change: to this last, however, it always approaches in the same manner as the vinous constantly verges to the acetous fermentation; and this will much more readily happen if the acid be allowed to remain with the unctuous feculent matter above-mentioned. When thus situated, the vinegar quickly loses its transparency, assumes a blackish colour, loses its sourness and agreeable odour, has an offensive taste and smell, and, when distilled at a certain period of the process, yields volatile alkali.

The liquor is now arrived to the last stage, viz.

3. The PUTREFACTIVE Fermentation.

From the preceding phenomena, it is obvious, that the same substance which is capable of the vinous and acetous, is also capable of the putrefactive, fermentation. It is perhaps impossible to induce the first without a mixture of the second; or the second without a mixture of the third. Hence every wine is a little acid; and there are few vinegars without some disposition towards putrefaction, or without volatile alkali, neutralized by the acid which predominates. Notwithstanding this seeming continuation of one and the same process, the putrefaction of vegetables has its particular phenomena. The vegetable matter, if in a fluid state, becomes turbid, and deposits a large quantity of feculent matter; a considerable number of air-bubbles are raised to the top; but their motion is not so brisk in the putrefactive as in the vinous, or even the acetous fermentation: neither the bulk nor heat of the liquor seems to be increased; but an acrid pungent vapour is perceived by the smell, and which, by chemical trials, is found to be the volatile alkali; by degrees this pungent odour is changed into one less pungent, but much more nauseous. If the same train of phenomena have taken place in a vege-

table consisting of parts somewhat solid, its cohesion is broke down into a soft pulpy mass; this mass, on drying, entirely loses its odour, leaving a black cherry-like residuum, containing nothing but earthy and saline substances.

It is proper to observe, that though the circumstances favouring the putrefactive are the same with those requisite to the vinous and acetous fermentations, yet these several conditions are not so indispensable to the former as to the two latter stages. All vegetables have more or less tendency to putrefaction, and a great number of them are capable of the acetous fermentation: but the proportion of those capable of the vinous is not considerable; and these last will run into the putrid in circumstances in which they cannot undergo the vinous or even the acetous fermentations. Thus flour made into a soft paste will become sour; but it must be perfectly dissolved in water to make it fit for the vinous stage; whereas mere dampness is sufficient to make it pass to the putrid fermentation: besides the condition of fluidity, a less degree of heat, and a more limited access of air, are sufficient for producing the putrefactive fermentation.

It is therefore probable, that all vegetables, in whatever state they may be, are liable to a kind of putrefaction: in some the change is slow and gradual, but never fails at length to break down the texture and cohesion of the most solid.

We formerly observed, that the vapours separated during the vinous fermentation were fixed air or aerial acid; and it is indeed true, that in the incipient state of this fermentation a quantity of gas is still evolved, and along with it a quantity of alkaline air; in the advanced state, however, we find these vapours of a different nature; they now tarnish silver, and render combinations of lead with the vegetable acids black. When produced in large quantity, and much confined, as happens in stacks of hay put up wet, they burst into actual flame, consuming the hay to ashes: on other occasions, the escape of these vapours discovers itself by an emission of light, as in the luminous appearance of rotten wood when placed in the dark. From the above phenomena it is evident, that these vapours abound with the principle of inflammability; and their odour probably depends on this principle loosely combined with the water, or some other parts of the volatilised matter. This gas is therefore different from that separated during the vinous fermentation; it is the phlogisticated, and sometimes the inflammable air of Dr Priestley, or the hydrogen of Lavoisier. See table of chemical nomenclature, &c. CHEMISTRY, page 598.

We have thus, for the sake of clearness, and in order to comprehend the whole of the subject, traced the phenomena of fermentation through its different stages: it is proper, however, to observe, that though every vegetable that has suffered the vinous will proceed to the acetous and putrefactive fermentations, yet the second stage is not necessarily preceded by the first, nor the third by the second; or in other words, the acetous fermentation is not necessarily confined to those substances which have undergone the vinous, nor the putrefactive to those which have undergone the acetous fermentation. Thus it is, that gums dissolved in water pass to the

acetous

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Vinegar.18
Phenomena
of putrefac-
tive fer-
mentation.19
Hydrogen.

Elements.

Elements.

acetous without undergoing the vinous fermentation; and glutinous matter seems to run into putrefaction without showing any previous acescence: and farther, these changes frequently happen although the matter be under those conditions which are favourable to the preceding stages.

From the foregoing sketch, the importance of this subject in the study of Pharmacy will be obvious at first sight: it cannot, however, afford us any useful information on the native principles of vegetables; but it presents to us new products, the importance of which is well known in chemistry, in medicine, and in arts. The necessity of being well acquainted with the several facts (for of theory we know none satisfactory), will appear in the pharmaceutical history and preparation of many of our most valuable drugs. We are next to consider a set of no less complicated operations, viz.

II. Productions from vegetables by FIRE.

20
Productions
by fire.

IN order to analyse, or rather to decompose, vegetables by the naked fire, any given quantity of dry vegetable matter is put into a retort of glass or earth. Having filled the vessel about one half or two thirds, we place it in a reverberatory furnace, adapting it to a proper receiver. To collect the elastic fluids, which, if confined, would burst the vessels (and which, too, it is proper to preserve, as being real products of the analysis), we use a perforated receiver with a crooked tube, the extremity of which is received into a vessel full of water, or of mercury, and inverted in a basin containing the same fluid: by this contrivance, the liquid matters are collected in the receiver, and the aeriform fluids pass into the inverted vessel. If the vegetable is capable of yielding any saline matter in a concrete state, we interpose between the retort and the receiver another vessel, upon whose sides the salt sublimes. These things being properly adjusted, we apply at first a gentle heat, and increase it gradually, that we may observe the different products in proper order. At first an insipid watery liquor passes over, which is chiefly composed of the water of vegetation; on the heat being a little farther increased, this watery liquor, or phlegm, becomes charged with an oily matter, having the odour of the vegetable, if it possessed any in its entire state; along with this oil we also obtain an acid resembling vinegar, and which communicates to the oil somewhat of a saponaceous nature; on the heat being carried still farther, we procure more acid, with an oil of a dark colour, and the colour gradually deepens as the distillation advances. The oil now ceases to retain the peculiar odour of the vegetable; and being scorched by the heat, sends forth a strong disagreeable smell like tar: it is then called *empyreumatic oil*. About this time also some elastic vapours rush into the inverted vessel; these generally consist of inflammable or fixed airs, and very often of a mixture of both; the volatile salt now also sublimes, if the vegetable was of a nature to furnish it. By the time the matter in the retort has acquired a dull red heat, nothing further will arise: we then stop; and allowing the vessel to cool, we find a mass of charcoal, retaining more or less the form and appearance of the vegetable before its decomposition.

We have thus described, in the order of their suc-

cession, the several products obtained from the generality of vegetables when analysed in close vessels and in a naked fire.

It is, however, to be understood, that the proportion of these principles turns out very various; the more succulent yield more water, and the more solid afford a greater quantity of the other principles. ²¹Independently also of this difference, the nature of the products themselves are found to differ in different vegetables: thus in the cruciform plants, and in the emulsive and farinaceous seeds, the saline matter which comes over with the water and oil is found to be alkaline; sometimes it is ammoniacal, from the combination of the acid with the volatile alkali passing over at the end of the process; it is also probable, that the acids of vegetables are not all of the same nature, though they exhibit the same external marks. When volatile alkali is obtained, it is always found in the mild effervescing state; it is procured, however, from a few vegetables only; it is seldom in a concrete form, being generally dissolved in the phlegm; and as it ordinarily makes its appearance about the end of the process, it is probable that its formation is owing to some peculiar combination of the oil and fixed alkali. The plants containing much oily combustible matter seem to be those which more peculiarly yield inflammable air, while the mucilages appear to be as peculiarly fitted for affording the fixed air or aerial acid. The chemical properties of charcoal seem to be always the same from whatever vegetable it has been produced: on a minute examination (which, however, is not the business of pharmacy), it is found to consist of fixed air, the principle of inflammability, a small quantity of earth, saline matter, and a little water. ²²The whole of the analysis then amounts to air, water, earth, and the principle of inflammability; for by repeated distillations the oil is resolved into water, the principle of inflammability, and a little earth; the saline matter also is a product arising from a combination of the earthy matter with water or the principle of inflammability, in some shape or other, or perhaps with both. That these combinations take place, has at least been the opinion of the chemists.

We formerly said that charcoal was partly composed of saline matter; it therefore remains that we should next decompose the charcoal, in order to obtain or separate the articles next to be mentioned.

The fixed Salts of Vegetables.

When vegetable charcoal has been burnt, there remains a quantity of ashes or cinders of a blackish grey or white colour: these, when boiled or infused in water, communicate to it a pungent saline taste; the salt thus held in solution may, by evaporation, be reduced to a concrete state: this saline matter, however, is generally found to be mixed with ferruginous earthy and other impurities, and likewise with a number of neutral salts of different kinds. In this mixed condition it is the

Potashes used in Commerce.

This salt, or rather compound of different salts, is ²³procured by burning large quantities of wood of any kind; and this process is called *incineration*: the predominating salt, however, is alkaline; and as the neu-

M m 2

tral

Elements. tral salts are obtained to better advantage by other means, they are generally neglected in the purification of potashes. Potashes, then, freed from its impurities, and separated from the other salts by processes to be hereafter mentioned, is now

The fixed vegetable Alkali.

24
Fixed vegetable alkali, characters of.

Alkalis in general are distinguished by a pungent taste, the very reverse of that of sourness; by their destroying the acidity of every sour liquor; and by their changing the blue and red colours of vegetables to a green: they attract more or less the moisture of the air, and some of them deliquesce. The fixed alkalis, which we shall at present consider more particularly, are fusible by a gentle heat: by a greater degree of heat they are dissipated; their fixity, therefore, is only relative to the other kind of alkalis, viz. the volatile: they dissolve and form glass with earths: and, lastly, when joined with acids to the point of saturation, they form what are called *Neutral Salts*.

These characters will afford some necessary and preliminary knowledge of these substances in general; and we shall afterwards find that they are sufficient to distinguish them from all other saline bodies: it is necessary, however, to examine them more minutely, for our analysis has not yet reached so far as to present them in their simplest state. Previous to the discoveries of Dr Black, the vegetable fixed alkali (which we at present speak of particularly), when separated from the foreign matters with which it is mixed in the ashes, was considered to be in its purest state: we shall afterwards find that it is still a compound body, and is really a neutral salt, compounded of pure alkali, and fixed air or the aerial acid. We presume, then, that the particular history of its chemical and medicinal properties will be better understood when we come to those processes by which it is brought to its most pure and simple state: See CHEMISTRY. We shall only therefore observe for the present, that fixed vegetable alkali, not only in its pure state, but also when neutralised by aerial acid, seems always to be one and the same thing, from whatever vegetable it has been produced. Those of some sea-plants must, however, be excepted: the saline matter obtained from these last is, like the former, in a mixed and impure state; it differs, however, from potashes, in containing an alkali of somewhat different properties. The cinder of sea-plants containing this alkali is called

Soda.

25
Soda, or natron, whence produced.

Soda, then, as we have just now hinted, is produced by the incineration of the kali and other sea-plants: And from this impure and mixed mass of cinder, is obtained the marine, mineral, or muriatic alkali, or natron, as it is now denominated by the London College. This alkali has acquired these names, because it is the base of the common marine or sea-salt: it differs from the vegetable alkali in being more easily crystallizable; when dried, it does not like the former attract humidity sufficient to form a liquid; it is somewhat less pungent to the taste, and, according to Bergman, has less attraction for acids than the vegetable alkali.

It is, however, to be observed, that this alkali, when deprived of fixed air, that is to say, when brought

to its purest state, can scarcely, if at all, be distinguished from the vegetable alkali; and indeed the true distinction can only be formed from their combinations, each of them affording with the same acid very different neutral salts. It belonged to this place to mention some of the characters of alkalis in general, and also some of those marks by which the vegetable and mineral alkalis are distinguished from each other; but for a more particular history of their chemical and medicinal properties, we refer to an account of the pharmaceutical preparations. As the volatile alkali is rarely produced from vegetables, but is generally obtained from animal matter, we shall consider that kind of alkali when we come to analyse the animal kingdom.

Of Vegetable Earth.

After all the saline matter contained in the ashes of vegetables has been wasted off by the processes before mentioned, there yet remains one insipid earthy-like powder, generally of a whitish colour, insoluble in water, and from which some iron may be attracted by the magnet. It is said to have formed alum with the vitriolic acid; a kind of selenite has also been obtained, but somewhat different from that produced by the union of the same acid with calcareous earth; this residuum of burnt vegetables differs also from calcareous earth, in not being susceptible of becoming quicklime by calcination. It has been found that this residuum, instead of an earth, is a calcareous phosphoric salt, similar to that obtained from the bones of animals.

We have thus finished our analysis of vegetables by the naked fire; and have only to observe, that, like the analysis by fermentation, it can afford us no useful information on the native principles of the vegetable itself.

When chemistry began first to be formed into a rational science, and to examine the component parts and internal constitution of bodies, it was imagined, that this resolution of vegetables by fire, discovering us all their active principles, unclogged and unmixed with each other, would afford the surest means of judging of their medicinal powers. But on prosecuting these experiments, it was soon found that they were insufficient for that end: that the analyses of poisonous and esculent plants agreed often as nearly as the analyses of one plant: that by the action of a burning heat, two principles of vegetables are not barely separated, but altered, transposed, and combined into new forms; inasmuch that it was impossible to know in what form they existed, and with what qualities they were endowed, before these changes and transpositions happened. If, for example, 32 ounces of a certain vegetable substance are found to yield ten ounces and a half of acid liquor, above one ounce and five drams of oil, and three drams and a half of fixed alkaline salt: what idea can this analysis give of the medicinal qualities of *gum Arabic*?

III. *SUBSTANCES naturally contained in vegetables, and separable by Art without Alteration of their native Qualities.*

It has been supposed, that there is one general fluid or blood which is common to all vegetables, and from which the fluids peculiar to particular plants and their parts are prepared by a kind of secretion: To this supposed

Elements.
Sap or
blood of
vegetables.

posed general fluid botanists have given the name of *sap*. This opinion is rendered plausible from the analogy in many other respects between vegetable and animal substances: and indeed if we consider the water of vegetation as this general fluid, the opinion is perhaps not very far from the truth; but the notion has been carried much farther than supposing it to be mere water; and the opinion of naturalists on this subject does not seem to be well supported by experience. It is difficult to extract this sap without any mixture of their constituent parts. But in a few vegetables, from which it distils by wounding their bark, we find this supposed general blood possessing properties not a little various: Thus the juice effused from a wounded birch is considerably different from that poured out from an incision in the vine.

1. Gross Oils.

Vegetables, like animals, contain an oil in two different states. That is, in several vegetables a certain quantity of oil is superabundant to their constitution, is often lodged in distinct reservoirs, and does not enter into the composition of their other principles: in most vegetables, again, another quantity of oil is combined, and makes a constituent part of their principles. Of this last we formerly spoke in our analysis of vegetables by fire; and it is the former we mean to consider, under the three following heads.

Gross oils abound chiefly in the kernels of fruits, and in certain seeds; from which they are commonly extracted by expression, and are hence distinguished by the name of *expressed oils*. They are contained also in all the parts of all vegetables that have been examined, and may be forced out by vehemence of fire; but here their qualities are much altered in the process by which they are extracted or discovered, as we have seen under the foregoing head.

These oils, in their common state, are not dissoluble either in vinous spirits or in water, though by means of certain intermedia they may be united both with the one and the other. Thus a skilful interposition of sugar renders them miscible with water into what are called *lobochs* and *oily draughts*; by the intervention of gum or mucilage they unite with water into a milky fluid: by alkaline salts they are changed into a soap, which is miscible both with water and spiritous liquors, and is perfectly dissolved by the latter into an uniform transparent fluid. The addition of any acid to the soapy solution absorbs the alkaline salt; and the oil, which of course separates, is found to have undergone this remarkable change, that it now dissolves without any intermedium in pure spirit of wine.

Expressed oils exposed to the cold lose their fluidity greatly: some of them, in a small degree of cold, congeal into a consistent mass. Kept for some time in a warm air, they become thin and highly rancid: their soft, lubricating, and relaxing quality is changed into a sharp acrimonious one: and in this state, instead of allaying, they occasion irritation; instead of obtunding corrosive humours, they corrode and inflame. These oils are liable to the same noxious alteration while contained in the original subject: hence arises the rancidity which the oily seeds and kernels, as almonds and those called the *cold seeds*, are so liable to contract in

keeping. Nevertheless, on triturating these seeds or kernels with water, the oil, by the intervention of the other matter of the subject, unites with the water, into an emulsion or milky liquor, which, instead of growing rancid, turns sour on standing.

It appears then that some kind of fermentation goes on in the progress of oils in the rancid state; and it would seem from some experiments by Mr Macquer, that an acid is evolved, which renders them more soluble in spirit of wine than before.

In the heat of boiling water, and even in a degree of heat as much exceeding this as the heat of boiling water does that of the human body, these oils suffer little dissipation of their parts. In a greater heat they emit a pungent vapour, seemingly of the acid kind; and when suffered to grow cold again, they are found to have acquired a greater degree of consistence than they had before, together with an acrid taste. In a heat approaching to ignition, in close vessels, the greatest part of the oil arises in an empyreumatic state, a black coal remaining behind.

2. Gross sebaceous matter.

From the kernels of some fruits, as that of the chocolate nut, we obtain, instead of a fluid oil, a substance of a butyraceous consistence; and from others, as the nutmeg, a solid matter as firm as tallow. These concretes are most commodiously extracted by boiling the substance in water: the sebaceous matter, liquefied by the heat, separates and arises to the surface, and resumes its proper consistence as the liquor cools.

The substances of this class have the same general properties with expressed oils, but are less disposed to become rancid in keeping than most of the common fluid oils. It is supposed by the chemists, that their thick consistence is owing to a larger admixture of an acid principle: for, in their resolution by fire, they yield a vapour more sensibly acid than the fluid oils; and fluid oils, by the admixture of concentrated acids, are reduced to a thick or solid mass.

3. Essential Oils.

Essential oils are obtained only from those vegetables, or parts of vegetables, that are considerably odorous. They are the direct principle in which the odour, and oftentimes the warmth, pungency, and other active powers of the subject, reside; whence their name of *essences* or *essential oils*.

Essential oils are secreted fluids; and are often lodged in one part of the plant, while the rest are entirely void of them. Sometimes they are found in separate spaces or receptacles; and are there visible by the naked eye: thus, in the rind of lemons, oranges, citrons, and many others, there are placed everywhere small pellucid vesicles, which, by pressing the peel near to the flame of a candle, squirt out a quantity of essential oil, forming a stream of lambent flame: hence, too, an oleosaccharum may be made, by rubbing the exterior surface of these peels with a piece of lump sugar, which at once tears open these vesicles, and absorbs their contained oil.

Essential oils unite with rectified spirit of wine, and compose with it one homogeneous transparent fluid; though some of them require for this purpose a much larger

29
Gross or
expressed
oils, properties of.

30
Properties
of sebaceous
matter.

31
Essential
oils,
whence
obtained.

Elements,
32
Their pro-
perties,

larger proportion of the spirit than others. The difference of their solubility perhaps depends on the quantity of disengaged acid; that being found by Mr Macquer not only to promote the solution of essential oils, but even of those of the unctuous kind. Water also, though it does not dissolve their whole substance, may be made to imbibe some portion of their more subtle matter, so as to become considerably impregnated with their flavour; by the admixture of sugar, gum, the yolk of an egg, or alkaline salts, they are made totally dissoluble in water. Digested with volatile alkali, they undergo various changes of colour, and some of the less odorous acquire considerable degrees of fragrance; while fixed alkali universally impairs their odour.

The specific gravity of most of these oils is less than that of water: some of them, however, are so heavy as to sink in water; but these varieties shall be noticed when we come to their preparation.

In the heat of boiling water, these oils totally exhale; and on this principle they are commonly extracted from subjects that contain them; for no other fluid, which naturally exists in vegetables, is exhalable by that degree of heat, excepting the aqueous moisture, from which the greatest part of the oil is easily separated. Some of these oils arise with a much less heat, a heat little greater than that in which water begins visibly to evaporate. In their resolution by a burning heat, they differ little from expressed oils.

Essential oils, exposed for some time to a warm air, suffer an alteration very different from that which the expressed undergo. Instead of growing thin, rancid, and acrimonious, they gradually become thick, and at length harden into a solid brittle concrete; with a remarkable diminution of their volatility, fragrant, pungency, and warm stimulating quality. In this state, they are found to consist of two kinds of matter; a fluid oil, volatile in the heat of boiling water, and nearly of the same quality with the original oil; and of a grosser substance which remains behind, not exhalable without a burning heat, or such as changes its nature, and resolves it into an acid, an empyreumatic oil, and a black coal.

The admixture of a concentrated acid instantly produces, in essential oils, a change nearly similar to that which time effects. In making these kinds of mixtures, the operator ought to be on his guard; for when a strong acid, particularly that of nitre, is poured hastily into an essential oil, a great heat and ebullition ensue, and often an explosion happens, or the mixture bursts into flame. The union of expressed oils with acids is accompanied with much less conflict.

4. Concrete essential oil.

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Concrete
essential
oil.

Some vegetables, as roses and elecampane root, instead of a fluid essential oil, yield a substance possessing the same general properties, but of a thick or sebaceous consistence. This substance appears to be of as great volatility and subtilty of parts as the fluid oils: it equally exhales in the heat of boiling water, and

concretes upon the surface of the collected vapour. The total exhalation of this matter, and its concreting again into its original consistent state, without any separation of it into a fluid and a solid part, distinguishes it from essential oils that have been thickened or indurated by age or by acids.

5. Camphor.

Camphor is a solid concrete, obtained chiefly from the woody parts of certain Indian trees. See CAMPHORA (B). It is volatile like essential oils, and soluble both in oils and inflammable spirits: it unites freely with water by the intervention of gum, but very sparingly and imperfectly by the other intermedia that render oils miscible with watery liquors. It differs from the sebaceous as well as fluid essential oils, in suffering no sensible alteration from long keeping; in being totally exhalable, not only by the heat of boiling water, but in a warm air, without any change or separation of its parts, the last particle that remains unexhaled appearing to be of the same nature with the original camphor; in its receiving no empyreumatic impression, and suffering no resolution, from any degree of fire to which it can be exposed in close vessels, though readily combustible in the open air; in being dissolved by concentrated acids into a liquid form; and in several other properties which it is needless to specify in this place.

34
Camphor,
distinguish-
ing char-
acters of,

6. Aroma,

Or spiritus rector, is the name given to the odorous principle of vegetables. These bodies differ greatly from one another in the quantity, strength, and volatility of the odorous principle which they contain. It is generally found united with volatile oils; but it is soluble in alcohol and water as well as in these. The slightest degree of heat is sufficient to disengage the aroma of plants. To obtain it, the plant must be distilled in a balneum marie, and its vapours received into a cold capital, which may condense and afterwards conduct them in a fluid state into the receiver. The product is pure odouriferous water, and is known by the name of essential or distilled water. This liquor is to be considered as a solution of the aroma or odorous principle in water. When aromatic water is heated, it loses its smell in consequence of the odorous principle being more volatile than the fluid in which it was dissolved. This principle is also dissipated by exposure to the air. Many facts would induce us to believe, that the principle of smell is one of the elementary principles of volatile oils; but we are as yet almost completely ignorant of its chemical nature, properties, and combinations.

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Odorous
principle.

7. Refin.

Essential oils, indurated by age or acids, are called *resins*. When the indurated mass has been exposed to the heat of boiling water, till its more subtle part, or the pure essential oil that remained in it, has exhaled, the gross matter left behind is likewise called *resin*. We find,

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Characters
of resin.

(B) It may likewise be procured from most of the volatile oils, by volatilizing the oil in a temperature a few degrees below that which is sufficient to elevate the camphor.

Elements. find, in many vegetables, resins analogous both to one and the other of these concretes; some containing a subtle oil, separable by the heat of boiling water; others containing nothing that is capable of exhaling in that heat.

Resins in general dissolve in rectified spirit of wine, though some of them much less easily than others: it is chiefly by means of this dissolvent that they are extracted from the subjects in which they are contained. They dissolve also in oils both expressed and essential; and may be united with watery liquors by means of the same intermedia which render the fluid oils miscible with water. In a heat less than that of boiling water, they melt into an oily fluid; and in this state they may be incorporated one with another. In their resolution by fire, in close vessels, they yield a manifest acid, and a large quantity of empyreumatic oil.

8. Gum.

³⁷ Gum, distinguishing characters of. Gum differs from the foregoing substances in being unflammable; for though it may be burnt to a coal, and thence to ashes, it never yields any flame. It differs remarkably also in the proportion of the principles into which it is resolved by fire; the quantity of empyreumatic oil being far less, and that of an acid far greater. In the heat of boiling water, it suffers no dissipation: nor does it liquefy like resins; but continues unchanged, till the heat be so far increased as to scorch or turn it to a coal.

By a little quantity of water, it is softened into a viscid adhesive mass, called *mucilage*: by a larger quantity it is dissolved into a fluid, which proves more or less glutinous according to the proportion of gum. It does not dissolve in vinous spirits, or in any kind of oil: nevertheless, when softened with water into a mucilage, it is easily miscible both with the fluid oils and with resins; which by this means become soluble in watery liquors along with the gum, and are thus excellently fitted for medicinal purposes.

This elegant method of uniting oils with aqueous liquors, which has been kept a secret in few hands, appears to have been known to Dr Grew. "I took (says he) oil of aniseeds, and pouring it upon another body, I so ordered it, that it was thereby turned into a perfect milk-white balsam or butter; by which means the oil became mingleable with any vinous or watery liquor, easily and instantaneously dissolving therein in the form of a milk. And note, this is done without the least alteration of the smell, taste, nature, or operation of the said oil. By somewhat the same means any other stillatitious oil may be transformed into a milk-white butter, and in like manner be mingled with water or any other liquor: which is of various use in medicine, and what I find oftentimes very convenient and advantageous to be done." (*Grew of Mixture, chap. v. inf. i. § 7.*) This inquiry has lately been further prosecuted in the first volume of the Medical Observations published by a society of physicians in London; where various experiments are related, for rendering oils, both essential and expressed, and different unctuous and resinous bodies, soluble in water by the mediation of gum. Mucilages have also been used for suspending crude mercury, and some other ponderous and insoluble substances: the mercury is by this means not a little divided; but it is found that the particles

are very apt to run together or subside, if a pretty constant agitation be not kept up.

As oily and resinous substances are thus united to water by the means of gum, so gums may in like manner be united to spirit of wine by the intervention of resins and essential oils; though the spirit does not take up near so much of the gum as water does of the oil or resin.

Acid liquors, though they thicken pure oils, or render them consistent, do not impede the dissolution of gum, or of oils blended with gum. Alkaline salts, on the contrary, both fixed and volatile, though they render pure oils soluble in water, prevent the solution of gum, and of mixtures of gum and oil. If any pure gum be dissolved in water, the addition of any alkali will occasion the gum to separate, and fall to the bottom in a consistent form; if any oily or resinous body was previously blended with the gum, this also separates, and either sinks to the bottom, or rises to the top, according to its gravity.

9. Gum-resin.

By gum-resin is understood a mixture of gum and ³⁸resin. Many vegetables contain mixtures of this kind, of what Gum-resin, compound- ed. in which the component parts are so intimately united, with the interposition perhaps of some other matter, that the compound, in a pharmaceutical view, may be considered as a distinct kind of principle; the whole mass dissolving almost equally in aqueous and in spirituous liquors; and the solutions being not turbid or milky, like those of the grosser mixtures of gum and resin, but perfectly transparent. Such is the astringent matter of bistort-root, and the bitter matter of gentian. It were to be wished that we had some particular name for this kind of matter; as the term *gum-resin* is appropriated to the grossest mixtures, in which the gummy and resinous parts are but loosely joined, and easily separable from each other.

We shall afterwards find that it will be convenient to imitate this natural combination by art. As the effects of medicines very generally depend on their solubility in the stomach, it is often necessary to bring their more insoluble parts, such as resinous and oily matters, into the state of gum-resin: this is done, as we have mentioned in the former article, by the mediation of mucilage. By this management these matters become much more soluble in the stomach; and the liquor thus prepared is called an emulsion, from its whitish colour, resembling that of milk.

10. Saline Matter.

Of the saline juices of vegetables there are different kinds, which have hitherto been but little examined: the sweet and the acid ones are the most plentiful and the best known.

There have lately, however, been discovered a considerable variety of salts in different vegetables. ³⁹The salts in vegetables. mild fixed alkali, which was formerly considered as a product of the fire, has been obtained from almost all plants by macerating them in acids; the vegetable alkali is the most common, but the mineral is also found in the marine plants. Besides the fixed alkali, several other salts have been detected in different vegetables; such as vitriolated tartar, common salt, Glauber's salt, nitre, febrifuge salt, and selenite. From some

Elements. some experiments, too, the volatile alkali has been supposed to exist ready formed in many plants of the cruciform or tetradynamian tribe.

It is, however, to be understood, that though some of these salts are really products of vegetation, others of them are not unfrequently adventitious, being imbibed from the soil without any change produced by the functions of the vegetable.

The juices of vegetables, exposed to a heat equal to that of boiling water, suffer generally no other change than the evaporation of their watery parts; the saline matter remaining behind, with such of the other fixed parts as were blended with it in the juice. From many plants, after the exhalation of great part of the water, the saline matter gradually separates in keeping, and concretes into little solid masses, leaving the other substances dissolved or in a moist state; from others, no means have yet been found of obtaining a pure concrete salt.

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particularly
the sweet
and the
sour.

The salts more peculiarly native and essential to vegetables are the sweet and the sour; these two are frequently blended together in the same vegetable, and sometimes pass into each other at different ages of the plant. Of the four salts several kinds are known in pharmacy and in the arts; such as those of sorrel, of lemons, oranges, citrons, &c. The saccharine salts are also obtained from a great number of vegetables; they may in general be easily discovered by their sweet taste: the sugar-cane is the vegetable from which this saline matter is procured in greatest quantity, and with most profit in commerce. For its medicinal and chemical properties, see MATERIA MEDICA, Art. VII.

The sweet and sour salts above-mentioned dissolve not only in water, like other saline bodies, but many of them, particularly the sweet, in rectified spirit also. The gross oily and gummy matter, with which they are almost always accompanied in the subject, dissolves freely along with them in water, but is by spirit in great measure left behind. Such heterogeneous matters as the spirit takes up, are almost completely retained by it, while the salt concretes; but of those which water takes up, a considerable part always adheres to the salt. Hence essential salts, as they are called, prepared in the common manner from the watery juices of vegetables, are always found to partake largely of the other soluble principles of the subject; while those extracted by spirit of wine are more pure. By means of rectified spirit, some productions of this kind may be freed from their impurities. Perfect saccharine concretions obtained from many of our indigenous sweets may be thus purified.

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Saline mat-
ter of ben-
zoin.

There is another kind of saline matter obtained from some resinous bodies, particularly from benzoin, which is of a different nature from the foregoing, and supposed by some of the chemists to be a part of the essential oil of the resin, coagulated by an acid, with the acid more predominant or more disengaged than in the other kinds of coagulated or indurated oils. These concretions dissolve both in water and in vinous spirits, though difficultly and sparingly in both: they show several evident marks of acidity, have a smell like that of the resin from which they are obtained, exhale in a heat equal to that of boiling water, or a little greater, and are inflammable in the fire.

11. Farina or flour.

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This substance partakes of the nature of gum, but has more taste, is more fermentable, and much more nutritive. It abounds in very many vegetables, and is generally deposited in certain parts, seemingly for the purpose of its being more advantageously accommodated to their nourishment and growth. Several of the bulbous and other roots, such as those of potatoes, briony, those from which cassava is extracted, salep, and many others, contain a great quantity of white *fecula* resembling and really possessing the properties of farina. The plants of the leguminous tribe, such as peas and beans, are found also to abound with this matter. But the largest quantity of farina resides in grains, which are therefore called *farinaceous*. Of this kind are wheat, rye, barley, oats, rice, and other similar plants.

At first sight farina appears to be one homogeneous substance: it is, however, found to be a compound of three different and separable parts. To illustrate this, we shall take as an example the farina of wheat, being the vegetable which affords it in greatest quantity, and in its most perfect state. To separate these different parts we form a paste with any quantity of flour and cold water; we suspend this paste in a bag of muslin or such like cloth; we next let fall on it a stream of cold water from some height, and the bag may now and then be very gently squeezed; the water in its descent carries down with it a very fine white powder, which is received along with the water in a vessel placed below the bag: the process must be continued till no more of this white powder comes off, which is known by the water that passes through the bag ceasing to be of a milky colour. The process being now finished, the farina is found to be separated into three different substances: the glutinous or vegeto-animal part remains in the bag; the amylum or starch is deposited from the water which has been received in the vessel placed below the bag; and, lastly, a mucous matter is held dissolved in the same water from which the starch has been deposited: this mucous part may be brought to the consistence of honey, by evaporating the water in which it is kept in solution.

These several parts are found also to differ remarkably in their sensible and chemical properties. The vegeto-animal part is of a whitish grey colour, is a tenacious, ductile, and elastic matter, partly possessing the texture of animal membranes. Distilled in a retort, it yields, like all animal matters, a true volatile alkali; and its coal affords no fixed alkali. It is not only insoluble, but even indiffusible, in water; both which appear from its remaining in the bag after long-continued lotions. Like gums, it is insoluble in alcohol, in oils, or ether; but it is also insoluble in water, and yields on distillation products very different from those afforded by gums: it is therefore of an animal nature, and approaches perhaps nearer to the coagulable lymph of animals than to any other substance.

The fixed alkali, by means of heat, dissolves the gluten vegeto-animal; but when it is precipitated from this solution by means of acids, it is found to have lost its elasticity. The mineral acids, and especially the nitrous,

Elements.

nitrous, are also capable of dissolving the vegeto-animal part of the farina.

The starch, *amylum*, or the amylaceous matter, makes the principal part of the farina. As we before noticed, it is that fine powder deposited from the water which has pervaded the entire farina: it is of a greyish white colour, but can be rendered much whiter by making it undergo a certain degree of fermentation. Starch is insoluble in cold water; but in hot water it forms a transparent glue: hence the necessity of employing cold water in separating it from the vegeto-animal part. Distilled in a retort, it yields an acid phlegm; and its coal affords, like other vegetables, a fixed alkaline salt. As starch forms the greatest part of the farina, it is probably the principal nutritive constituent in bread.

The mucous, or rather the mucoso-saccharine matter, is only in a very small quantity in bread. This substance on distillation is found to exhibit the phenomena of sugar. The use of this matter seems to be that of producing the vinous fermentation: and we may observe once for all, that the preparation of good bread probably depends on a proper proportion of the three different parts above described; viz. that the vinous fermentation is promoted by the mucoso-saccharine part, the acetous by the starch, and the putrid by the gluten vegeto-animal. From different states or degrees of these several stages of fermentation the qualities of good bread are probably derived.

12. Of the Colouring Matter of Vegetables.

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Of the nature of the colouring matter of vegetables.

The colouring matter of vegetables seems to be of an intermediate nature between the gummy and resinous parts. It is in many plants equally well extracted by water, and by rectified spirit: it is also, however, procurable in the form of a lake, not at all soluble in either of these menstrua. It would seem that the colouring matter, strictly so called, has hitherto eluded the researches of chemists. It is only the *basse* or *nidus*, in which the real colouring matter is embodied, that chemistry has as yet reached; and on the chemical properties of this *basse*, colours are capable of being extracted by different menstrua, and of being variously accommodated to the purposes of dying. The substance from which the colours of vegetables are immediately derived, is without doubt a very subtle body. Since plants are known to lose their colour when excluded from the light of the sun, there is reason to think that the immediately colouring substance is primarily derived from the matter of the sun, somewhat elaborated by vegetable life.

Many of these dyes are evolved or variously modified by chemical operations. Thus a colouring matter is somewhat deposited in the form of a *facula* during the putrefaction of the vegetable; in others it is evolved or changed by alum, by acids, or by alkali. We may also observe, that any part of the vegetable may be the base of the colouring matter. This appears from the solubility of the different dyes in their proper menstrua; and in these solutions we have not been able to separate the real colouring matter from the base in which it is inviscated. After all, then, we must conclude, that a full investigation of this subject more properly belongs to the sublimer parts of CHE-

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MISTRY, than to the business in which we are at present engaged.

The colouring drugs are considered in their proper places.

In finishing our history of the vegetable kingdom, it only remains that we should offer some

General Observations on the foregoing Principles.

1. ESSENTIAL oils, as already observed, are obtainable only from a few vegetables: but gross oil, resin, gum, and saline matter, appear to be common, in greater or less proportion, to all; some abounding more with one and others with another.

2. The several principles are in many cases intimately combined; so as to be extracted together from the subject, by those dissolvents, in which some of them separately could not be dissolved. Hence watery infusions and spirituous tinctures of a plant, contain respectively more substances than those of which water or spirit is the proper dissolvent.

3. After a plant has been sufficiently infused in water, all that spirit extracts from the residuum may be considered as consisting wholly of such matter as directly belongs to the action of spirit. And, on the contrary, when spirit is applied first, all that water extracts afterwards may be considered as consisting only of that matter of which water is the direct dissolvent.

4. If a vegetable substance, containing all the principles we have enumerated, be boiled in water, the essential oil, whether fluid or concrete, and the camphor, and volatile essential salt, will gradually exhale with the steam of the water, and may be collected by receiving the steam in proper vessels placed beyond the action of the heat. The other principles not being volatile in this degree of heat, remain behind: the gross oil and sebaceous matter float on the top: the gummy and saline substance, and a part of the resin, are dissolved by the water, and may be obtained in a solid form by straining the liquor, and exposing it to a gentle heat till the water has exhaled. The rest of the resin, still retained by the subject, may be extracted by spirit of wine, and separated in its proper form by exhaling the spirit. On these foundations most of the substances contained in vegetables may be extracted, and obtained in a pure state, however they may be compounded together in the subject.

5. Sometimes one or more of the principles is found naturally disengaged from the others, lying in distinct receptacles within the subject, or extravasated and accumulated on the surface. Thus, in the dried roots of angelica, cut longitudinally, the microscope discovers veins of resin. In the flower cups of hypericum, and the leaves of the orange-tree, transparent points are distinguished by the naked eye: which, at first view, seem to be holes, but on a closer examination are found to be little vesicles filled with essential oil. In the bark of the fir, pine, larch, and some other trees, the oily receptacles are extremely numerous, and so copiously supplied with the oily and resinous fluid, that they frequently burst, especially in the warm climates, and discharge their contents in great quantities. The acacia tree in Egypt, and the plum and cherry among ourselves, yield almost pure gummy exudations. From

Elements.

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Practical observations on vegetables.

N a

Elements.

a species of ash is secreted the saline sweet substance manna; and the only kind of sugar with which the ancients were acquainted, appears to have been a natural exudation from the cane.

6. The foregoing principles are, as far as is known, all that naturally exist in vegetables; and all that art can extract from them, without such operations as change their nature, and destroy their original qualities. In one or more of these principles, the colour, smell, taste, and medicinal virtues, of the subject, are almost always found concentrated.

7. In some vegetables the whole medicinal activity resides in one principle. Thus, in sweet almonds, the only medicinal principle is a gross oil; in horse-radish root, an essential oil; in jalap root, a resin; in marsh mallow root, a gum; in the leaves of sorrel, a saline acid substance.

8. Others have one kind of virtue residing in one principle, and another in another. Thus Peruvian bark has an astringent resin and a bitter gum; wormwood a strong flavoured essential oil and a bitter gum resin.

9. The gross insipid oils and sebaceous matters, the simple insipid gums, and the sweet and acid saline substances, seem to agree both in their medicinal qualities and in their pharmaceutic properties.

10. But essential oils, resins, and gum-resins, differ much in different subjects. As essential oils are universally the principle of odour in vegetables, it is obvious that they must differ in this respect as much as the subjects from which they are obtained. Resins frequently partake of the oil, and consequently of the differences depending on it; with this further diversity, that the gross resinous part often contains other powers than those which reside in oils. Thus from wormwood a resin may be prepared, containing not only the strong smell and flavour but likewise the whole bitterness of the herb; from which last quality the oil is entirely free. The bitter, astringent, purgative, and emetic virtue of vegetables, reside generally in different sorts of resinous matter, either pure or blended with gummy and saline parts; of which kind of combinations there are many so intimate, that the component parts can scarcely be separated from each other, the whole compound dissolving almost equally in aqueous and spirituous menstrua.

11. There are some substances also, which, from their being totally soluble in water, and not in spirit, may be esteemed to be mere gums; but which, nevertheless, possess virtues never to be found in the simple gums. Such are the astringent gum called *acacia*, and the purgative gum extracted from aloes.

12. It is supposed that vegetables contain certain subtle principles different in different plants, of too great tenuity to be collected in their pure state, and of which oils, gums, and resins, are only the matrices or vehicles. This inquiry is foreign to the purposes of pharmacy, which is concerned only about grosser and more sensible objects. When we obtain from an odoriferous plant an essential oil, containing in a small compass the whole fragrance of a large quantity of the subject, our intentions are equally answered, whether the substance of the oil be the direct odorous matter, or whether it has diffused through it a fragrant principle more subtle than itself. And when this oil in long keeping loses its odour, and becomes a resin, it is

equal in regard to the present considerations, whether the effect happens from the avolation of a subtle principle, or from a change produced in the substance of the oil itself.

SECT. II. ANIMALS.

From the history we have already given of the vegetable kingdom, our details on animal substances may in many particulars be considerably abridged. All animals are fed on vegetables, either directly or by the intervention of other animals. No part of their substance is derived from any other source except water. The small quantity of salt used by man and some other animals, is only necessary as a seasoning or stimulus to the stomach. As the animal then is derived from the vegetable matter, we accordingly find that the former is capable of being resolved into the same principles as those of the latter. Thus, by repeated distillations, we obtain from animal substances, water, oil, air, an easily destructible salt, and charcoal. These secondary principles are by farther processes at length resolvable into the same proximate principles which we found in vegetables, viz. water, air, earth, and the principle of inflammability. But though the principles of vegetable and animal substances are fundamentally the same, yet these principles are combined in a very different manner. It is exceedingly rare that animal substances are capable of the vinous or acetous fermentations; and the putrefactive, into which they run remarkably fast, is also different in some particulars from the putrefaction of vegetables; the escape of the phlogiston in the form of light is more evident, and the smell is much more offensive, in the putrefaction of animal than of vegetable substances. The putrefaction of urine is indeed accompanied with a peculiar fetor, by no means so intolerable as that of other animal matters: this we suppose to be owing to the pungency derived from the volatile alkali, and also to the urine containing less inflammable matter than the blood and many other fluids. When analysed by a destructive heat, animals afford products very different from those of vegetables: the empyreumatic oil has a particular and much more fetid odour; and the volatile salt, instead of being an acid, as it is in most vegetables, is found in animals to be a volatile alkali. Chemists have spoken of an acid procurable from animal substances; and indeed certain parts of animal bodies are found to yield a salt of this kind; but it by no means holds with animal substances in general; and though the proofs to the contrary were even conclusive, it is confessedly in so small a quantity as not to deserve any particular regard. In some animals, however, an acid exists, uncombined and ready formed in their bodies. This is particularly manifest in some insects, especially ants, from which an acid resembling the acetous has been procured by boiling them in water. The solid parts of animal bodies, as the muscles, teguments, tendons, cartilages, and even the bones, when boiled with water, give a gelatinous matter or glue resembling the vegetable gums, but much more adhesive. We must, however, except the horny parts and the hair, which seem to be little soluble either in water or in the liquors of the stomach. The acids, the alkalis, and quicklime, are also found to be powerful solvents of animal matters. It is from the solid parts

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The nature
of animal
substances.

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Elements.

parts that the greatest quantity of volatile alkali is obtained; it arises along with a very fetid empyreumatic oil, from which it is in some measure separated by repeated rectifications. This salt is partly in a fluid, and partly in a concrete state; and from its having been anciently prepared in the greatest quantity from the horns of the hart, it has been called *salt* or *spirit of hartshorn*. Volatile alkali is, however, procurable from all animals, and from almost every part of animal bodies except fat. Though we are sometimes able to procure fixed alkali from an animal cinder, yet it is probable that this salt did not make any part of the living animal, but rather proceeded from the introduction of some saline matter, incapable of being assimilated by the functions of the living creature.

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Of the fluid
parts of
animals.

In speaking of the fluid parts of animals, we should first examine the general fluid, or blood, from whence the rest are secreted. The blood, which at first sight appears to be an homogeneous fluid, is composed of several parts, easily separable from each other, and which the microscope can even perceive in its uncoagulated state. On allowing it to stand at rest, and to be exposed to the air, it separates into what are called the *crassamentum* and the *serum*. The *crassamentum*, or cruor, chiefly consists of the red globules, joined together by another substance, called the *coagulable lymph*: the chemical properties of these globules are not as yet understood; but they seem to contain the greatest quantity of the iron found in the blood. The serum is a yellowish subviscid liquor, having little sensible taste or smell: at a heat of 160 of Fahrenheit, it is converted into a jelly. This coagulation of the serum is also owing to its containing a matter of the same nature with that in the *crassamentum*, viz. the coagulable lymph: whatever then coagulates animal blood, produces that effect on this concrescible part. Several causes, and many different substances, are capable of effecting this coagulation; such as contact of air, heat, alcohol, mineral acids, and their combinations with earths, as alum, and some of the metallic salts. The more perfect neutral salts are found to prevent the coagulation, such as common salt and nitre.

Of the fluids secreted from the blood, there are a great variety in men and other animals. The excrementitious and redundant fluids are those which afford in general the greatest quantity of volatile alkali and empyreumatic oil: there are also some of the secreted fluids, which, on a chemical analysis, yield products in some degree peculiar to themselves. Of this kind is the urine, which is found to contain in the greatest abundance the noted salt formed from the phosphoric acid and volatile alkali. The fat, too, has been said to differ from the other animal matters, in yielding by distillation a strong acid, but no volatile alkali. There is also much variety in the quantity and state of the combination of the saline and other matters in different secreted fluids. But for a fuller investigation of this and other parts of the subject, we refer to ANATOMY, CHEMISTRY, and PHYSIOLOGY; with which it is more immediately connected than with the elements of pharmacy.

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Oils and
fats of ani-
mals.

Animal oils and fats, like the gross oils of vegetables, are not of themselves soluble either in water or vinous spirits: but they may be united with water by the intervention of gum or mucilage. Most of them

may be changed into soap, by fixed alkaline salts; and be thus rendered miscible with spirit as well as water.

The odorous matter of some odoriferous animal-substances, as musk, civet, castor, is, like essential oil, soluble in spirit of wine, and volatile in the heat of boiling water. Carthusius relates, that from castor an actual essential oil has been obtained in a very small quantity, but of an exceedingly strong diffusive smell.

The vesicating matter of cantharides, and those parts of sundry animal substances in which their peculiar taste resides, are dissolved by rectified spirit, and seem to have some analogy with resins and gummy resins.

The gelatinous principle of animals, like the gum of vegetables, dissolves in water, but not in spirit or in oils: like gums also, it renders oils and fats miscible with water into a milky liquor.

Some insects, particularly the ant, are found to contain an acid juice, which approaches nearly to the nature of vegetable acids.

There are, however, sundry animal juices, which differ greatly, even in these general kinds of properties, from the corresponding ones of vegetables. Thus animal serum, which appears analogous to vegetable gummy juices, has this remarkable difference, that though it mingles uniformly with cold or warm water, yet on considerably heating the mixture, the animal-matter separates from the watery fluid, and concretes into a solid mass. Some physicians have been apprehensive, that the heat of the body, in certain diseases, might rise to such a degree, as to produce this dangerous or mortal concretion of the serous humours: but the heat requisite for this effect is greater than the human body appears capable of sustaining, being nearly about the middle point between the greatest human heat commonly observed and that of boiling water.

The soft and fluid parts of animals are strongly disposed to run into putrefaction; they putrefy much sooner than vegetable matters; and when corrupted, prove more offensive.

This process takes place, in some degree, in the bodies of living animals, as often as the juices stagnate long, or are prevented, by an obstruction of the natural emunctories, from throwing off their more volatile and corruptible parts.

During putrefaction, a quantity of air is generated; all the humours become gradually thinner, and the fibrous parts more lax and tender. Hence the tympany, which succeeds the corruption of any of the viscera, or the imprudent suppression of dysenteries by astringents; and the weakness and laxity of the vessels observable in scurvy, &c.

The *crassamentum* of human blood changes by putrefaction into a dark livid-coloured liquor; a few drops of which tinge the serum with a tawny hue, like the ichor of sores and dysenteric fluxes, as also the white of the eye, the saliva, the serum of blood drawn from a vein, and the liquor that oozes from a blister in deep scurvy and the advanced state of malignant fevers.

The putrid *crassamentum* changes a large quantity of recent urine to a flame-coloured water, so common in fevers and in the scurvy. This mixture, after standing an hour or two, gathers a cloud resembling what is seen in the crude water of acute distempers, with some

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Miscellaneous
observations on
several animal
substances.

oily matter on the surface like the scum which floats on scorbutic urine.

The serum of the blood deposits, in putrefaction, a sediment resembling well-digested pus, and changes to a faint olive-green. A serum so far putrefied as to become green, is perhaps never to be seen in the vessels of living animals; but in dead bodies this serum is to be distinguished by the green colour which the flesh acquires in corrupting. In salted meats, this is commonly ascribed to the brine, but erroneously; for that has no power of giving this colour, but only of qualifying the taste, and in some degree, the ill effects of corrupted aliments. In foul ulcers and other sores, where the serum is left to stagnate long, the matter is likewise found of this colour, and is then always acrimonious.

The putrefaction of animal substances is prevented or retarded by most saline matters, even by the fixed and volatile alkaline salts, which have generally been supposed to produce a contrary effect. Of all the salts that have been made trial of, sea-salt seems to resist putrefaction the least; in small quantities it even accelerates the process. The vegetable bitters, as chamomile flowers, are much stronger antiseptics, not only preserving flesh long uncorrupted, but likewise somewhat correcting it when putrid: the mineral acids have this last effect in a more remarkable degree. Vinous spirits, aromatic and warm substances, and the acrid plants, falsely called *alkalescent*, as scurvy-grass and horse-radish, are found also to resist putrefaction. Sugar and camphor are found to be powerfully antiseptic. Fixed air, or the aerial acid, is likewise thought to resist putrefaction; but above all the vapours of nitrous acid, in the form of air (the nitrous air of Dr Priestley), is found to be the most effectual in preserving animal bodies from corruption. The list of the septics, or of those substances that promote putrefaction, is very short; and such a property has only been discovered in calcareous earths and magnesia, and a very few salts, whose bases are of these earths.

It is observable, that notwithstanding the strong tendency of animal matters to putrefaction, yet broths made from them, with the admixture of vegetables, instead of putrefying turn sour. Sir John Pringle has found, that when animal flesh in substance is beaten up with bread or other farinaceous vegetables, and a proper quantity of water, into the consistence of a pap, this mixture likewise, kept in a heat equal to that of the human body, grows in a little time sour; while the vegetable matters, without the flesh, suffer no such change.

It was observed in the preceding section, that some few vegetables, in the resolution of them by fire, discover some agreement in the matter with bodies of the animal kingdom; yielding a volatile alkaline salt in considerable quantity, with little or nothing of the acid or fixed alkali, which the generality of vegetables afford. In animal substances also, there are some exceptions to the general analysis: from animal fats, as we before observed, instead of a volatile alkali, an acid liquor is obtained; and their empyreumatic oil wants the peculiar offensiveness of the other animal oils.

SECT. III. MINERALS.

I. OILS and BITUMENS.

In the mineral kingdom is found a fluid oil called *naphtha* or *petroleum*, floating on the surface of waters, or issuing from clefts of rocks, particularly in the eastern countries, of a strong smell, very different from that of vegetable or animal oils, limpid almost as water, highly inflammable, not soluble in spirit of wine, and more averse to union with water than any other oils.

There are different sorts of these mineral oils, more or less tinged, of a more or less agreeable, and a stronger or weaker, smell. By the admixture of concentrated acids, which raise no great heat or conflict with them, they become thick, and at length consistent; and in these states are called *bitumens*.

These thickened or concreted oils, like the corresponding products of the vegetable kingdom, are generally soluble in spirit of wine, but much more difficultly, more sparingly, and for the most part only partially; they liquefy by heat, but require the heat to be considerably stronger than vegetable products. Their smells are various; but all of them, either in the natural state, when melted or set on fire, yield a peculiar kind of strong scent, called from them *bituminous*.

The solid bitumens are, amber, jet, asphaltum, or bitumen of Judea, and fossil or pit coal. All these bitumens, when distilled, give out an odorous phlegm, or water, more or less coloured and saline; an acid, frequently in a concrete state; an oil, at first resembling the native petroleum, but soon becoming heavier and thicker; and, lastly, a quantity of volatile alkali is obtained: the residuum is a charry matter, differing in its appearances according to the nature of the bitumen which had been analysed.

From the observations of several naturalists, it is probable that all bitumens are of vegetable and animal origin; that the circumstances by which they differ from the resinous and other oily matters of vegetables and animals, are the natural effects of time, or of an alteration produced on them by mineral acids; or perhaps they are the effect of both these causes combined. This opinion is the more probable, since bitumens, on a chemical analysis, yield oil and volatile alkali; neither of which are found in any other minerals.

II. EARTHS.

The little impropriety of joining the vegetable and animal earths to the mineral, must be overlooked for the sake of bringing both under one synoptical view. Under the mineral earths are included stones; these being no other than earths in an indurated state.—The different kinds of these bodies hitherto taken notice of are the following.

1st, Earths soluble in the nitrous, marine, and vegetable acids, but not at all, or exceeding sparingly, in the vitriolic acid. When previously dissolved in other acids, they are precipitated by the addition of this last, which thus unites with them into insipid, or nearly insipid concretes, not dissoluble in any liquor.

Of

Of this kind are,

1. The mineral calcareous earth: *distinguished by its being convertible in a strong fire, without addition, into an acrimonious calx called quicklime.* This earth occurs in a variety of forms in the mineral kingdom: the fine soft chalk, the coarser limestones, the hard marbles, the transparent spars, the earthy matter contained in waters, and which separating from them incrustates the sides of the caverns, or hangs in icicles from the top, receiving from its different appearances different appellations. How strongly soever some of these bodies have been recommended for particular medicinal purposes, they are fundamentally no other than different forms of this calcareous earth; simple pulverization depriving them of the superficial characters by which they were distinguished in the mass. Most of them generally contain a greater or less admixture of some of the indissoluble kinds of earth; which, however, affects their medicinal qualities no otherwise than by the addition which it makes to their bulk. Chalk appears to be one of the purest; and is therefore in general preferred. They all burn into a strong quicklime: in this state a part of them dissolves in water, which thus becomes impregnated with the astringent and lithontriptic powers that have been erroneously ascribed to some of the earths in their natural state.

During the calcination of calcareous earths, a large quantity of elastic vapour is discharged: the absence of this fluid is the cause of the causticity of quicklime, and of its solubility in water in the form of lime-water. For a more full inquiry into this subject, see FIXED AIR, &c.

2. The animal calcareous earth: *burning into quicklime like the mineral.* Of this kind are oyster-shells and all the marine shells that have been examined; though with some variation in the strength of the quicklime produced from them.

3. The earth of bones and horns: *not at all burning into quicklime.* This kind of earth is more difficult of solution in acids than either of the preceding. It is accompanied in the subjects with a quantity of gelatinous matter, which may be separated by long boiling in water, and more perfectly by burning in the open air. The earth may be extracted also from the bone or horn, though difficultly, by means of acids; whereas vegetables and the soft parts of animals yield their pure earth by burning only.

3d, *Earths soluble with ease in the vitriolic as well as other acids, and yielding, in all other combinations therewith, saline concretes soluble in water.*

1. Magnesia alba: *composing with the vitriolic acid a bitter purgative salt.* This earth has not yet been found naturally in a pure state. It is obtained from the purging mineral waters and their salts; from the bitter liquor which remains after the crystallization of sea-salt from sea-water; and from the fluid which remains uncrystallized in the putrefaction of some sorts of rough nitre. The ashes of vegetables appear to be nearly the same kind of earth.

2. Aluminous earth: *composing with the vitriolic acid a very astringent salt.* This earth also has not been found naturally pure. It is obtained from alum; which is no other than a combination of it with the vitrio-

lic acid; it may likewise be extracted, by strong boiling in that acid, from clays and boles.

3d, *Earths which by digesting in acids, either in the cold or in a moderate warmth, are not at all dissolved.*

1. Argillaceous earth: *becoming hard, or acquiring an additional hardness, in the fire.* Of this kind of earth there are several varieties, differing in some particular properties: as the purer clays, which when moistened with water form a very viscous mass, difficultly diffusible through a larger quantity of the fluid, and slowly subsiding from it; boles, less viscous, more readily miscible with water, and more readily subsiding; and ochres, which have little or nothing of the viscosity of the two foregoing, and are commonly impregnated with a yellow or red ferruginous calx.

2. Crystalline earth: *naturally hard, so as to strike sparks with steel; becoming friable in a strong fire.* Of this kind are flints, crystals, &c. which appear to consist of one and the same earth, differing in the purity, hardness, and transparency of the mass.

3. Gypseous earth: *reducible by a gentle heat into a soft powder, which unites with water into a mass, somewhat viscous and tenacious while moist, but quickly drying, and becoming hard.* A greater heat deprives the powder of this property, without occasioning any other alteration. Such are the transparent selenites; the fibrous stony masses improperly called *English tale*; and the granulated gypsa or plaster of Paris stones. Though these bodies, however, have been commonly thought to be mere earths, of a distinct kind from the rest, they appear, both from analytical and synthetical experiments, to be no other than combinations of the mineral calcareous earth with vitriolic acid.

4. Talky earth: *scarcely alterable by a vehement fire.* The masses of this earth are generally of a fibrous or leafy texture; more or less pellucid, bright or glittering, smooth and unctuous to the touch; too flexible and elastic to be easily pulverised; soft, so as to be cut with a knife. In these respects some of the gypseous earths nearly resemble them, but the difference is readily discovered by fire; a weak heat reducing the gypseous to powder, while the strongest makes no other alteration in the talky, than somewhat diminishing their flexibility, brightness, and unctuousity.

III. METALS.

Of metals, the next division of mineral bodies, the most obvious characters are, their peculiar bright aspect, perfect opacity, and great weight; the lightest of them is fix, and the heaviest upwards of 19 times heavier than an equal bulk of water.

To understand the writers in chemistry, it is proper to be informed, that metals are subdivided into the perfect, the imperfect, and the semimetals.

Those possessed of ductility and malleability, and which are not sensibly altered by very violent degrees of heat, are called *perfect metals*: Of these there are three; gold, silver, and platina. It is, however, probable, that the mark of their indestructibility by fire is only relative: and indeed modern chemists have been able, by a very intense degree of heat, to bring gold into the state of a calx, or something very nearly resembling it.

Elements.

Those metallic substances which possess the distinctive properties of the perfect metals, but in a less degree, are called the *imperfect metals*: These are, copper, iron, tin, lead.

Lastly, those bodies having the metallic characters in the most imperfect state, that is to say, those which have no ductility and the least fixity in the fire, are distinguished by the name of *semi-metals*: These are, regulus of antimony, bismuth, zinc, regulus of cobalt, nickel, and regulus of arsenic; which last might be rather considered as the boundary between the metallic and the saline bodies.

Mercury has been generally ranked in a class by itself.

All metallic bodies, when heated in close vessels, melt or *fuse*. This *fusion* takes place at different degrees of heat in different metals; and it does not appear that this process produces any change in the metals, provided it be conducted in close vessels. Metals, exposed to the combined action of air and fire, are converted into an earth-like substance called *calx*: by this process, which we call *calcination*, the metal suffers remarkable changes. From the distinctive marks we have before given of the metallic bodies, it will be obvious, that the perfect metals are most slowly, the imperfect more quickly, and the semi-metals most easily and soonest, affected in this operation. This earth-like powder, or *calx*, is found to possess no metallic aspect, but is considerably heavier than the metal before its calcination: it has no longer any affinity with metallic bodies, nor even with the metal from which it has been produced.

Besides this method of calcining metals by air and fire, they may likewise be brought into the state of a calx, by dissolving them in acids, from which they may be afterwards freed by evaporating the acid, or by adding to the solution an alkaline salt. Metals are also sometimes dephlogisticated by detonation with nitre. This change in their obvious properties is generally accompanied with a remarkable alteration in their medicinal virtues: thus quicksilver, which taken into the body in its crude state and undivided, seems inactive; proves, when calcined by fire, even in small doses, a strong emetic and cathartic, and in smaller ones, a powerful alterative in chronical disorders; while regulus of antimony, on the contrary, is changed by the same treatment, from a high degree of virulence to a state of inactivity.

Calces of mercury and arsenic exhale in a heat below ignition: those of lead and bismuth, in a red or low white heat, run into a transparent glass; the others are not at all vitrescible, or not without extreme vehemence of fire. Both the calces and glasses recover their metallic form and qualities again by the skilful addition of any kind of inflammable substance that does not contain a mineral acid. This recovery of the metallic calces into the metallic form is called *reduction*. During this process an elastic aerial fluid escapes, which is found to be *pure air*.

Is the conversion of metals into calces owing to the discharge of phlogiston, or to the absorption of pure air? And is the reduction to be ascribed to the absorption of phlogiston, or to the escape of pure air? And again, Is the calcination to be explained by the discharge of phlogiston and consequent precipitation

of pure air? And is the reduction effected by the absorption of phlogiston, either furnished by inflammable bodies or precipitated in consequence of the discharge of pure air? On these questions there is much dispute among modern chemists: We thought it only necessary to state them here, as a full inquiry into the subject is by no means the province of pharmacy. We, however, think it prudent to retain the doctrine of Stahl: and we do this the more readily, because it has been followed in our article CHEMISTRY, and because it is abundantly clear in its illustration of the pharmaceutical processes. We do not mean, however, to reject any modern discovery which may serve to illustrate our subjects.

All metallic bodies dissolve in acids; some only in particular acids, as silver and lead in the nitrous: some only in compositions of acids, as gold in a mixture of the nitrous and marine: and others, as iron and zinc, in all acids. Some likewise dissolve in alkaline liquors, as copper: and others, as lead, in expressed oils. Fused with a composition of sulphur and fixed alkaline salt, they are all, except zinc, made soluble in water.

All metallic substances, dissolved in saline liquors, have powerful effects in the human body, though many of them appear in their pure state to be inactive. Their activity is generally in proportion to the quantity of acid combined with them: Thus lead, which in its crude form has no sensible effect, when united with a small portion of vegetable acid into ceruss, discovers a low degree of the styptic and malignant quality, which it so strongly exerts when blended with a larger quantity of the same acid into what was called *saccharum saturni*, but now more properly *sal plumbi*, or *plumbum acetatum*: and thus mercury, with a certain quantity of the marine acid, forms the violent corrosive sublimate, which by diminishing the proportion of acid becomes the mild medicine called *mercurius dulcis*.

IV. ACIDS.

The salts of this order are very numerous; but as we are at present treating of *Minerals*, it is only therefore the *mineral* or *fossil* acids we mean to speak of in this place.

These are distinguished by the names of the concretes from which they have been principally extracted; the *vitriolic* from vitriol, the *nitrous* from nitre or saltpetre; and the *marine* or *muratic* from common sea-salt. The form they are generally in, is that of a watery fluid: They have all a remarkable attraction for water: They imbibe the humidity of the air with rapidity and the generation of heat. Although heat be produced by their union with water, yet when mixed with ice in a certain manner, they generate a prodigious degree of cold. Acids change the purple and blue colours of vegetables to a red: they resist fermentation; and lastly, they impress that peculiar sensation on the tongue called *sourness*, and which their name imports. But it is to be observed, that they are all highly corrosive, insomuch as not to be safely touched, unless largely diluted with water, or united with such substances as obtund or suppress their acidity. Mixed hastily with vinous spirits, they raise a violent ebullition and heat, accompanied with a copious discharge of noxious fumes: a part of the acid

unites

Elements.

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unites intimately with the vinous spirit into a new compound, void of acidity, called *dulcified spirit*. It is observable, that the marine acid is much less disposed to this union with spirit of wine than either of the other two; nevertheless, many of the compound salts resulting from the combination of earthy and metallic bodies with this acid, are soluble in that spirit, while those with the other acids are not. All these acids effervesce strongly with alkaline salts both fixed and volatile, and form with them neutral salts; that is, such as discover no marks either of an acid or alkaline quality.

The nitrous and marine acids are obtained in the form of a thin liquor; the acid part being blended with a large proportion of water, without which it would be diffused into an incoercible vapour: the vitriolic stands in need of so much less water for its condensation as to assume commonly an oily consistence (whence it is called *oil of vitriol*), and in some circumstances even a solid one. Alkaline salts, and the soluble earths and metals, absorb from the acid liquors only the pure acid part: so that the water may now be evaporated by heat, and the compound salt left in a dry form.

From the coalition of the different acids with the three different alkalis, and with the several soluble earths and metallic bodies, result a variety of saline compounds; the principal of which shall be particularised in the sequel of this article.

The vitriolic acid, in its concentrated liquid state, is much more ponderous than the other two; it emits no visible vapour in the heat of the atmosphere, but imbibes moisture which increases its weight: the nitrous and marine emit copious corrosive fumes, the nitrous yellowish red, and the marine white ones. If bottles containing the three acids be stopp'd with cork, the cork is found in a little time tinged black with the vitriolic, corroded into a yellow substance by the nitrous, and into a whitish one by the marine.

It is above laid down as a character of one of the classes of earths, that the vitriolic acid precipitates them when they are previously dissolved in any other acid: it is obvious, that on the same principle this particular acid may be distinguished from all others. This character serves not only for the acid in its pure state, but likewise for all its combinations that are soluble in water. If a solution of any compound salt, whose acid is the vitriolic, be added to a solution of chalk in any other acid, the vitriolic acid will part from the substance with which it was before combined, and join itself to the chalk, forming therewith a compound; which, being no longer soluble in the liquor, renders the whole milky for a time, and then gradually subsides.

This acid may be distinguished also, in compound salts, by another criterion not less strongly marked: If any salt containing it be mixed with powdered charcoal, and the mixture exposed in a close vessel to a moderately strong fire, the acid will unite with the directly inflammable part of the charcoal, and compose therewith a genuine sulphur. Common brimstone is no other than a combination of the vitriolic acid with a small proportion of inflammable matter. With any kind of inflammable matter which is not volatile in close vessels, as the coal of vegetables, of animals, or

of bitumens, this acid composes always the same identical sulphur.

The nitrous acid also, with whatever kind of body it be combined, is both distinguished and extricated by means of any inflammable substance being brought to a state of ignition with it. If the subject be mixed with a little powdered charcoal and made red-hot, a deflagration or fulmination ensues, that is, a bright flame with a hissing noise; and the inflammable matter and the acid being thus consumed or dissipated together, there remains only the substance which was before combined with the acid, and the small quantity of ashes afforded by the coal.

These properties of the nitrous acid deflagrating with inflammable substances, and of the vitriolic forming sulphur with them, serve not only as criteria of the respective acids in the various forms and disguises, but likewise for discovering inflammable matter in bodies, when its quantity is too small to be sensible on other trials.

All these acids will be more particularly examined when we come to treat of each of them apart. There are, however, a few other mineral acids which are of importance to be known: these are, *aqua regia*; *acid of borax*; *sparry acid*; and, lastly, *fixed air*, which has of late been called *aërial acid*, or *acid of chalk*.

Aqua regia has been generally prepared by a mixture of certain proportions of the nitrous and muriatic acids. It is of little avail in pharmacy whether we consider it as a distinct acid, or only as a modification of the muriatic. It has been found, that the muriatic acid when distilled with *manganese* (a peculiar fossile substance, showing a remarkable attraction to phlogiston), suffers a change which renders it capable of dissolving gold and platina. Whether this change be produced by the acid acquiring a redundancy of pure air, or by its being deprived of phlogiston, it is not our business to decide. This experiment, however, renders it probable, that the nitrous acid in the common *aqua regia* is only subservient to accomplishing the same change in the muriatic acid which is produced by distilling that acid with manganese.

As *aqua regia* has been only used in the nicer operations in chemistry, and in the art of assaying, we think it unnecessary to say more of it in this place.

The *acid of borax*, or *sedative salt of Homberg*, may be extracted from borax, a neutral salt, whose base is mineral alkali. It has also been found native in the waters of several lakes in Tuscany. It is a light, crystallized, concrete salt; its taste is sensibly acid; it is difficultly soluble in water; but the solution changes blue vegetable colours to a red. With vitrescent earths it fuses into a white glass: it unites with the other alkalis, with magnesia, and with quicklime. The salts resulting from these combinations are very imperfectly known. The salt has been called *sedative*, from its supposed virtues as an anodyne and refrigerant remedy; but modern physicians have very little faith in this once celebrated drug.

The *sparry acid* is so called from its being extracted from a fossil called *sparry fluor*, or *vitreous spar*. It is not yet determined whether it be a distinct acid; and as it has not yet been employed for any purpose in pharmacy, we think it would be improper to attempt any farther account of it here.

Besides.

Elements.

Besides the acids above-mentioned, there have also been discovered acids seemingly of a particular nature, in amber, in arsenic, and in black-lead: but as these have not hitherto been applied to any use in pharmacy, they cannot properly have a place in this article.

We now come to the last, but perhaps the most generally diffused, acid in nature: this is the aerial acid, or

Fixed Air.

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Nature of
fixed air,
&c.

In our pharmaceutical history of this body, we shall only make use of the two names *fixed air* and *aerial acid*, being those most generally used, and which in our opinion are most applicable to our own subject. Fixed air is a permanently elastic fluid, being only *fixed* when in a state of combination with calcareous earth or other substances from which it may be extricated. It has received many different names, according to the substances from which it is disengaged, and to the different opinions concerning its nature: it is the *gas silvestre* of Helmot, the *fixed air* of Dr Black, the *acid of chalk*, *calcareous gas*, *mephitic gas*, *mephitic acid*, and *aerial acid*, of many modern chemists. In accommodating our account of it to the purposes of pharmacy, it is most convenient to consider it as an acid. The aerial acid may be extricated by heat, or by other acids, from all calcareous earths; that is, from all those earths which by calcination are converted into quicklime; such as chalk, marble, limestone, sea-shells, &c. It is likewise extricated from mild, fixed, and volatile alkalis, and from magnesia alba. Thus, if the vitriolic, or almost any other acid, be added to a quantity of calcareous earth or mild alkali, a brisk effervescence immediately ensues; the fixed air, or aerial acid, is discharged in bubbles; and the other acid takes its place. If this process be conducted with an apparatus to be afterwards described, the aerial acid, now separated from the calcareous earth, may be received and preserved in close vessels. When thus disengaged, it assumes its real character, viz. that of a *permanently elastic fluid*. Fixed air is also separated in great quantity during the vinous fermentation of vegetable matters. When a calcareous earth is deprived of this acid by heat, it is converted into the caustic substance *quicklime*. When alkalis, fixed or volatile, are deprived by any means of their aerial acid, they are rendered much more caustic, incapable of crystallization, or of effervescing with other acids. They are also in this *deaerated* state much more powerful in dissolving other bodies. By recombining this acid with quicklime, calcined magnesia, or alkali, any of which had been deprived of it, these substances again assume their former weight and properties. These bodies, then, when combined with aerial acid, are called *mild*; as *mild calcareous earth*, *mild alkali*, &c.: and when deprived of this acid they are called *caustic*; as *caustic calcareous earths*, *caustic alkali*, &c.: but as magnesia is not rendered caustic by calcination, there would perhaps be less danger in calling them *aerated* and *deaerated*. The aerial acid is more disposed to unite with caustic calcareous earth (quicklime) than with any other substance; next to that, its attraction is for fixed alkali, then for magnesia, and lastly for volatile alkali. We shall afterwards find that these relative powers of the different substances to unite

with this acid, lay the foundation of many important processes in pharmacy.

When we pour a small quantity of the aerial acid into lime-water, the liquor instantly assumes a white colour, and the lime gradually precipitates, leaving the water clear and tasteless: the lime in this experiment has absorbed the acid, and has therefore become *mild* or *aerated* earth. The aerial acid is capable of being absorbed by water, and the water thus impregnated precipitates lime in lime-water; but if a certain larger quantity of this impregnated water be added, the lime is redissolved, and the liquor recovers its transparency. Water impregnated with aerial acid is capable of dissolving iron; and in this way are formed native and artificial chalybeate waters. Zinc is also soluble in the same liquor. This acid is easily expelled from the water by removing the pressure of the atmosphere, by boiling, and even by time alone, if the vessel be not kept close shut. Fixed air extinguishes flame, vegetable and animal life, and ought therefore to be cautiously managed: like other acids it changes the blue colours of vegetables to a red, and communicates an acidulous taste to the water impregnated with it. The attraction of the aerial acid, even to quicklime, is but feeble; as we know of no other acids whatever that are not able to disengage it.

From these several facts it will appear obvious, that *mild or effervescing alkalis*, whether fixed or volatile, are really neutral salts, compounded of the aerial acid and pure alkali: like other acids, it unites with these bodies, diminishes their causticity, and effects their crystallization. In speaking, therefore, of *pure alkali*, we ought to confine ourselves to those in the *caustic* or *deaerated* state; or, in other words, to those which are deprived of their fixed air or aerial acid, with which they formed a compound salt. Many other properties of this acid might be mentioned, but we have now noticed all those which we thought were concerned in the business of pharmacy. We shall have occasion to recur to the subject when we come to the preparation of several compound drugs.

Let us next take a view of what passes in the combinations of acids with different substances.

If a fixed alkaline salt be united with a vegetable acid, as vinegar, and formed into a neutral salt, on adding to this compound some marine acid, the acetous acid will be disengaged, so as to exhale totally in a moderate heat, leaving the marine in possession of the alkali: the addition of the nitrous will in like manner dispossess the marine, which now arises in its proper white fumes, though without such an addition it could not be extricated from the alkali by any degree of heat: on the addition of the vitriolic acid, the nitrous gives way in its turn, exhaling in red fumes, and leaving only the vitriolic acid and the alkali united together.

Again, if any metallic body be dissolved in an acid, the addition of any earthy body that is dissoluble in that acid will precipitate the metal: a volatile alkaline salt will in like manner precipitate the earth: and a fixed alkali will dislodge the volatile; which last being readily exhaled by heat, the remaining salt will be the same as if the acid and fixed alkali had been joined together at first, without the intervention of any of the other bodies.

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or elective
attraction.

The power in bodies on which these various transpositions and combinations depend, is called by the chemists *affinity* or *elective attraction*; a term, like the Newtonian *attraction*, designed to express not the cause, but the effect. When an acid spontaneously quits a metal to unite with an alkali, they say it has a *greater affinity* or *attraction* to the alkali than to the metal: and when, on the contrary, they say it has a greater affinity to fixed alkali than to the volatile, they mean only that it will unite with the fixed in preference to the volatile; and that if previously united with a volatile alkali, it will forsake this for a fixed one.

The doctrine of the affinities of bodies is of a very extensive use in chemical pharmacy: many of the official processes, as we shall see hereafter, are founded on it: several of the preparations turn out very different from what would be expected by a person unacquainted with these properties of bodies; and several of them, if, from an error in the process, or other causes, they prove unfit for the use intended, may be rendered applicable to other purposes, by such transpositions of their component parts as are pointed out by the knowledge of their affinities.

We shall therefore subjoin a table of the principal affinities observed in pharmaceutical operations, formed from that of the famous Bergman. See other tables for more general purposes in the article CHEMISTRY.

The table is to be thus understood. The substance printed in capitals, on the top of each series, has the greatest affinity with that immediately under it, a less affinity with the next, and so on to the end of the series: that is, if any of the remote bodies has been combined with the top one, the addition of any of the intermediate bodies will disunite them; the intermediate body uniting with the uppermost body of the series, and throwing out the remote one. Thus, in the first series of the affinities of the vitriolic acid, a fixed alkali being placed between the acid and iron, it is to be concluded, that wherever vitriolic acid and iron are mixed together, the addition of any fixed alkaline salt will unite with the acid, and occasion the iron to be separated. Where several substances are expressed in one series, it is to be understood, that any of those bodies which are nearer to the uppermost, will in like manner disengage from it any of those which are more remote.

Elements.
⁵⁶
Explan-
ation of the
table of sin-
gle attrac-
tions.

TABLE OF SINGLE ATTRACTIONS.

BY WATER.

VITRIOLIC ACID.	NITROUS ACID.	MARINE ACID.	AQUA REGIA.	ACID OF BORAX.	ACID OF SUGAR.	ACID OF TARTAR.	ACID OF SORREL.	ACID OF LEMON.
Terra ponderosa, Vegetable alkali, Fossil alkali, Lime, Magnesia, Volatile alkali, Clay, Zinc, Iron, Lead, Tin, Copper, Antimony, Arsenic, Mercury, Silver, Gold, Water, Alcohol.	Vegetable alkali, Fossil alkali, Terra ponderosa, Lime, Magnesia, Volatile alkali, Clay, Zinc, Iron, Lead, Tin, Copper, Antimony, Arsenic, Mercury, Silver, Gold, Water, Alcohol.	Vegetable alkali, Fossil alkali, Terra ponderosa, Lime, Magnesia, Volatile alkali, Clay, Zinc, Iron, Lead, Tin, Copper, Antimony, Arsenic, Mercury, Silver, Gold, Water, Alcohol.	Vegetable alkali, Fossil alkali, Terra ponderosa, Lime, Magnesia, Volatile alkali, Clay, Zinc, Iron, Lead, Tin, Copper, Antimony, Arsenic, Mercury, Silver, Gold, Water, Alcohol.	Lime, Terra ponderosa, Magnesia, Vegetable alkali, Fossil alkali, Volatile alkali, Clay, Zinc, Iron, Lead, Tin, Copper, Antimony, Arsenic, Mercury, Silver, Gold, Water, Alcohol.	Lime, Terra ponderosa, Magnesia, Vegetable alkali, Fossil alkali, Volatile alkali, Clay, Zinc, Iron, Lead, Tin, Copper, Antimony, Arsenic, Mercury, Silver, Gold, Water, Alcohol.	Lime, Terra ponderosa, Magnesia, Vegetable alkali, Fossil alkali, Volatile alkali, Clay, Zinc, Iron, Lead, Tin, Copper, Antimony, Arsenic, Mercury, Silver, Gold, Water, Alcohol.	Lime, Terra ponderosa, Magnesia, Vegetable alkali, Fossil alkali, Volatile alkali, Clay, Zinc, Iron, Lead, Tin, Copper, Antimony, Arsenic, Mercury, Silver, Gold, Water, Alcohol.	Lime, Terra ponderosa, Magnesia, Vegetable alkali, Fossil alkali, Volatile alkali, Clay, Zinc, Iron, Lead, Tin, Copper, Antimony, Arsenic, Mercury, Silver, Gold, Water, Alcohol.

BY FIRE.

Vegetable alkali, Fossil alkali, Terra ponderosa, Lime, Magnesia, Metals, Volatile alkali, Clay.	Terra ponderosa, Vegetable alkali, Fossil alkali, Lime, Magnesia, Metals, Volatile alkali, Clay.	Terra ponderosa, Vegetable alkali, Fossil alkali, Lime, Magnesia, Metals, Volatile alkali, Clay.	Terra ponderosa, Vegetable alkali, Fossil alkali, Lime, Magnesia, Metals, Volatile alkali, Clay.	Lime, Terra ponderosa, Magnesia, Vegetable alkali, Fossil alkali, Metals, Volatile alkali, Clay.			
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TABLE of SINGLE ATTRACTIONS continued.

By WATER.

ACETOUS ACID.	ACID OF PHOSPHORUS.	AERIAL ACID.	VEGETABLE ALKALI.	FOSSIL ALKALI.	VOLATILE ALKALI.	TERRA PONDEROSA.	LIME.	MAGNESIA.
Terra ponderosa, Vegetable alkali, Fossil alkali, Volatile alkali, Lime, Magnesia, Clay, Zinc, Iron, Lead, Tin, Copper, Antimony, Arsenic, Mercury, Silver, Gold, Water, Alcohol.	Lime, Terra ponderosa, Magnesia, Vegetable alkali, Fossil alkali, Volatile alkali, Clay, Zinc, Iron, Lead, Tin, Copper, Antimony, Arsenic, Mercury, Silver, Gold, Water.	Terra ponderosa, Lime, Vegetable alkali, Fossil alkali, Magnesia, Volatile alkali, Clay, Zinc, Iron, Lead, Tin, Copper, Antimony, Arsenic, Mercury, Silver, Gold, Water.	Vitriolic acid, Nitrous acid, Marine acid, Phosphoric acid, Acid of sugar, Acid of tartar, Acid of ferrel, Acid of lemon, Acid of benzoïn, Acetous acid, Acid of borax, Aerial acid, Water, Unctuous oils, Sulphur, Metals.	Vitriolic acid, Nitrous acid, Marine acid, Phosphoric acid, Acid of sugar, Acid of tartar, Acid of ferrel, Acid of lemon, Acid of benzoïn, Acetous acid, Acid of borax, Aerial acid, Water, Unctuous oils, Sulphur, Metals.	Vitriolic acid, Nitrous acid, Marine acid, Phosphoric acid, Acid of sugar, Acid of tartar, Acid of ferrel, Acid of lemon, Acid of benzoïn, Acetous acid, Acid of borax, Aerial acid, Water, Unctuous oils, Sulphur, Metals.	Vitriolic acid, Acid of sugar, Acid of ferrel, Vitriolic acid, Phosphoric acid, Nitrous acid, Marine acid, Acid of tartar, Acid of lemon, Acid of benzoïn, Acetous acid, Acid of borax, Aerial acid, Water, Unctuous oil, Sulphur.	Acid of sugar, Acid of ferrel, Vitriolic acid, Acid of tartar, Phosphoric acid, Nitrous acid, Marine acid, Acid of ferrel, Acid of tartar, Acid of lemon, Acid of benzoïn, Acetous acid, Acid of borax, Aerial acid, Water, Unctuous oil, Sulphur.	Acid of sugar, Phosphoric acid, Vitriolic acid, Nitrous acid, Marine acid, Acid of ferrel, Acid of tartar, Acid of lemon, Acid of benzoïn, Acetous acid, Acid of borax, Aerial acid, Sulphur.

By FIRE.

ACETOUS ACID.	ACID OF PHOSPHORUS.	AERIAL ACID.	VEGETABLE ALKALI.	FOSSIL ALKALI.	VOLATILE ALKALI.	TERRA PONDEROSA.	LIME.	MAGNESIA.
Terra ponderosa, Vegetable alkali, Fossil alkali, Lime, Magnesia, Metals, Volatile alkali, Clay.	Lime, Terra ponderosa, Magnesia, Vegetable alkali, Fossil alkali, Metals, Volatile alkali, Clay.	Terra ponderosa, Lime, Vegetable alkali, Fossil alkali, Magnesia, Volatile alkali, Clay, Zinc, Iron, Lead, Tin, Copper, Antimony, Arsenic, Mercury, Silver, Gold, Water.	Vitriolic acid, Nitrous acid, Marine acid, Phosphoric acid, Acid of sugar, Acid of tartar, Acid of ferrel, Acid of lemon, Acid of benzoïn, Acetous acid, Acid of borax, Aerial acid, Water, Unctuous oils, Sulphur, Metals.	Vitriolic acid, Nitrous acid, Marine acid, Phosphoric acid, Acid of sugar, Acid of tartar, Acid of ferrel, Acid of lemon, Acid of benzoïn, Acetous acid, Acid of borax, Aerial acid, Water, Unctuous oils, Sulphur, Metals.	Vitriolic acid, Nitrous acid, Marine acid, Acetous acid, Terra ponderosa, Lime, Magnesia, Clay, Sulphur.	Vitriolic acid, Acid of borax, Vitriolic acid, Nitrous acid, Marine acid, Acid of benzoïn, Acetous acid, Fixed alkali, Sulphur, Lead.	Phosphoric acid, Acid of borax, Vitriolic acid, Nitrous acid, Marine acid, Fixed alkali, Sulphur, Lead.	Phosphoric acid, Acid of borax, Vitriolic acid, Nitrous acid, Marine acid, Fixed alkali, Sulphur, Lead.

TABLE of SINGLE ATTRACTIONS continued.

By WATER.

CLAY.	WATER.	SULPHUR.	HEPAR SULPHURIS.	ALCOHOL.	ÆTHER.	ESSENTIAL OILS.	EXPRESSED OILS.	GOLD.
Vitriolic acid, Nitrous acid, Marine acid, Acid of sugar, Acid of forrel, Acid of tartar, Acid of lemon, Acid of phosphorus, Acid of benzoïn, Acetous acid, Acid of borax, Aerial acid.	Vegetable alkali, Fossil alkali, Volatile alkali, Alcohol, Æther, Vitriolic acid, Vitriolated tartar, Alum, Green Vitriol, Corrosive sublimate.	Lead, Tin, Silver, Mercury, Arsenic, Antimony, Iron, Vegetable alkali, Volatile alkali, Terra ponderosa, Lime, Magnesia, Unctuous oils, Essential oils, Æther, Alcohol.	Gold, Silver, Mercury, Arsenic, Antimony, Copper, Tin, Lead, Iron, Alcohol, Water.	Water, Æther, Essential oils, Volatile alkali, Fixed alkali, Hepar sulphuris, Sulphur.	Alcohol, Essential oils, Expressed oils, Water, Sulphur.	Æther, Alcohol, Expressed oils, Fixed alkali, Sulphur.	Æther, Essential oils, Fixed alkali, Volatile alkali, Sulphur.	Æther, Marine acid, Aqua-regia, Nitrous acid, Vitriolic acid, Acid of tartar, Phosphoric acid, Fixed alkali, Volatile alkali.

By FIRE.

CLAY.	WATER.	SULPHUR.	HEPAR SULPHURIS.	ALCOHOL.	ÆTHER.	ESSENTIAL OILS.	EXPRESSED OILS.	GOLD.
Phosphoric acid, Acid of borax, Vitriolic acid, Nitrous acid, Marine acid, Fixed alkali, Sulphur, Lead.		Fixed alkali, Iron, Copper, Tin, Lead, Silver, Antimony, Mercury, Arsenic.	Iron, Copper, Tin, Lead, Silver, Antimony, Mercury, Arsenic.					Mercury, Copper, Silver, Lead, Tin, Antimony, Iron, Zinc, Arsenic, Hepar sulphuris.

TABLE of SINGLE ATTRACTIONS continued.

BY WATER.

SILVER.	MERCURY.	LEAD.	IRON.	COPPER.	TIN.	ARSENIC.	ZINC.	ANTIMONY.
Marine acid, Acid of fugar, Vitriolic acid, Phosphoric acid, Nitrous acid, Acid of tartar, Acid of forrel, Acid of lemon, Acetous acid, Aerial acid, Volatile acid.	Marine acid, Acid of fugar, Phosphoric acid, Vitriolic acid, Acid of tartar, Acid of lemon, Nitrous acid, Acetous acid, Acid of borax, Aerial acid.	Vitriolic acid, Acid of fugar, Acid of tartar, Phosphoric acid, Acid of forrel, Marine acid, Nitrous acid, Acid of lemon, Acetous acid, Acid of borax, Aerial acid, Fixed alkali.	Acid of fugar, Acid of tartar, Vitriolic acid, Marine acid, Nitrous acid, Phosphoric acid, Acid of forrel, Acid of lemon, Acetous acid, Acid of borax, Aerial acid.	Acid of fugar, Acid of tartar, Marine acid, Vitriolic acid, Nitrous acid, Phosphoric acid, Acid of forrel, Acid of lemon, Acetous acid, Acid of borax, Aerial acid, Fixed alkali, Volatile alkali, Expressed oils.	Acid of tartar, Marine acid, Vitriolic acid, Acid of fugar, Phosphoric acid, Nitrous acid, Acid of forrel, Acid of lemon, Acetous acid, Acid of borax, Fixed alkali, Volatile alkali.	Marine acid, Acid of fugar, Vitriolic acid, Nitrous acid, Acid of tartar, Phosphoric acid, Acid of forrel, Acid of lemon, Acetous acid, Volatile alkali, Unctuous oils.	Acid of fugar, Vitriolic acid, Marine acid, Nitrous acid, Acid of forrel, Acid of tartar, Phosphoric acid, Acid of lemon, Acetous acid, Acid of borax, Aerial acid, Volatile alkali.	Marine acid, Acid of fugar, Vitriolic acid, Nitrous acid, Acid of tartar, Acid of forrel, Phosphoric acid, Acid of lemon, Acetous acid, Acid of borax, Aerial acid.

BY FIRE.

Lead, Copper, Mercury, Tin, Gold, Antimony, Iron, Zinc, Arsenic, Hepar sulphuris, Sulphur.	Gold, Silver, Lead, Tin, Zinc, Copper, Antimony, Arsenic, Iron, Hepar sulphuris, Sulphur.	Gold, Silver, Copper, Mercury, Tin, Antimony, Lead, Mercury, Hepar sulphuris, Sulphur.	Gold, Silver, Arsenic, Iron, Zinc, Antimony, Tin, Lead, Mercury, Hepar sulphuris, Sulphur.	Zinc, Mercury, Copper, Antimony, Gold, Silver, Lead, Iron, Arsenic, Hepar sulphuris, Sulphur.	Copper, Iron, Silver, Tin, Lead, Gold, Zinc, Antimony, Hepar sulphuris, Sulphur.	Copper, Antimony, Tin, Mercury, Silver, Gold, Arsenic, Lead, Iron.	Iron, Copper, Tin, Lead, Silver, Zinc, Gold, Mercury, Arsenic, Hepar sulphuris, Sulphur.
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CASES

CASES OF DOUBLE ELECTIVE ATTRACTIONS.

FURNACES.

By WATER.

1. Epsom salt with Mild vegetable alkali,	1. Vitriolated tartar and Common magnesia.
2. Vitriolic ammoniac with Mild mineral alkali,	2. Glauber's salt and Mild volatile alkali.
3. Vitriolated tartar with Nitrous selenite,	3. Vitriolic selenite and Saltpetre.
4. Vitriolated tartar with Mercurial nitre,	4. Vitriol of mercury and Saltpetre.
5. Saltpetre with Luna cornea,	5. Lunar caustic and Cubic nitre.
6. Vitriolated tartar with Luna cornea,	6. Vitriol of silver and Febrifugal salt.
7. Regenerated tartar with Mercurial nitre,	7. Acetous mercurial salt and Saltpetre.

By HEAT.

1. Vitriolic ammoniac with Common salt,	1. Common sal ammoniac and Glauber's salt.
2. Vitriolic ammoniac with Regenerated tartar,	2. Acetous ammoniacal salt and Vitriolated tartar.
3. Vitriol of mercury with Common salt,	3. Glauber's salt and Corrosive sublimate.
4. Crude antimony with Corrosive sublimate,	4. Butter of antimony and Fictitious cinnabar.

CHAP. II. Of the Pharmaceutical Apparatus.

37 The appli-
cation of
fire of great
importance
in pharma-
ceutical
prepara-
tions.

ONE of the principal parts of the pharmaceutical apparatus consists in contrivances for containing and applying fire, and for directing and regulating its power. Of these contrivances called *furnaces*, there are different kinds, according to the conveniency of the place, and the particular purposes they are intended to answer. We shall here endeavour to give a general idea of their structure, and of the principles on which they are built; and for particulars refer the reader to FURNACE; and CHEMISTRY, page 450.

The most simple furnace is the common stove, other-
wise called the *furnace for open fire*. This is usually
made of an iron hoop, five or six inches deep; with a
grate or some iron bars across the bottom, for support-
ing the fuel. It either stands upon feet, so as to be
moveable from place to place; or is fixed in brick-work.
In this last case, a cavity is left under the grate, for re-
ceiving the ashes that drop through it; and an aper-
ture or door, in the forepart of this ash-pit, serves both
for allowing the ashes to be occasionally raked out, and
for admitting air to pass up through the fuel. This
furnace is designed for such operations as require only
a moderate heat; as infusion, decoction, and the eva-
poration of liquids.

A deeper hoop or body, cylindrical, parallelopipedal, widening upwards, elliptical, or of other figures; formed of, or lined with, such materials as are capable of sustaining a strong fire; with a grate and ash-pit beneath, as in the preceding; and communicating at the top with a perpendicular pipe, or chimney; makes a *wind furnace*.

The greater the perpendicular height of the chimney, The heat of
the greater will be the draught of air through the fur- the fire in-
nace, and the more intensely will the fire burn; pro- creased in
vided the width of the chimney is sufficient to allow a these fur-
free passage to all the air that the furnace can receive naces by
through the grate; for which purpose, the area of the perpen- the perpen-
aperture of the chimney should be nearly equal to the dicular
area of the interstices of the grate. height of
the chimney.

Hence, where the chimney consists of moveable pipes, made to fit upon each other at the ends, so that the length can be occasionally increased or diminished, the vehemence of the fire will be increased or diminished in the same proportion.

In furnaces whose chimney is fixed, the same advantage may be procured on another principle. As the intensity of the fire depends wholly upon the quantity of air successively passing through and animating the burning fuel, it is obvious, that the most vehement fire may be suppressed or restrained at pleasure, by closing more or less either the ash-pit door by which the air is admitted, or the chimney by which it passes off; and that the fire may be more or less raised again, by more or less opening those passages. A moveable plate, or register, in any convenient part of the chimney, affords commodious means of varying the width of the passage, and consequently of regulating the heat. This is most conveniently accomplished by keeping the ash-pit door entirely shut, and regulating the heat by a range of holes in a damping plate; each hole is provided with a proper pin, whereby we may shut it at pleasure. These holes may be made to bear a certain proportion to each other; the smallest being considered as one, the next to it in size must have twice the opening, the next to that double of the second, &c.; and so on to the number of seven or eight; and by combining these holes variously together, we can admit any quantity of air from 1 to 128; as 1. 2. 4. 8. 16. 32. 64. 128. See FURNACE, p. 507.

There are two general kinds of these wind-furnaces; one, with the chimney on the top, over the middle of the furnace; the other with the chimney on one side, and the mouth clear.

Elements.
62
Observations on
two different kinds
of wind
furnaces.

In the first, either the upper part of the furnace is contracted to such an aperture, that the chimney may fit upon it; or it is covered with an arched dome, or with a flat plate, having a like aperture in the middle. As in this disposition of the chimney, the inside of the furnace cannot be come at from above, a door is made in the side, a little above the grate, for supplying the fuel, inspecting the matter in the fire, &c.

For performing fusions in this furnace, the crucible, or melting vessel, is placed immediately among the fuel, with a slip of brick, or some other like support, between it and the grate, to keep the cold air, which enters underneath, from striking on its bottom.

When designed as a reverberatory, that is for distillation in long-necked coated glass retorts, two iron bars are placed across, above the fire, for supporting the vessel, whose neck comes out at an aperture made for that purpose in the side. This aperture should be made in the side opposite to the door above-mentioned; or at least so remote from it, that the receiver, fitted on the neck of the distilling vessel without the furnace, may not lie in the operator's way when he wants to stir the fire or throw in fresh fuel.

The other kind of wind-furnace communicates, by an aperture in its back part near the top, either with an upright pipe of its own, or with the chimney of the room; in which last case, all other passages into the chimney must be closed. Here the mouth of the furnace serves for a door, which may be occasionally covered with a plate or tile. Of this kind is the furnace most commonly used for fusion in a crucible.

This last construction, by leaving the mouth of the furnace clear, affords the convenience of letting into it a boiling or evaporating pan, a copper still, an iron pot, for distilling hartshorn, an iron sand-pot, or other like vessels, of such a size that they may be supported on the furnace by their rims. The mouth being thus occupied by the vessels, a door must be made in the side for supplying and stirring the fuel.

When a furnace of this kind is designed only for a sand-bath, it is most commodious to have the sand placed on a long iron plate, furnished with a ledge of freestone or brick-work at each side. The mouth of the furnace is to be closely covered by one end of this plate; and the canal by which the furnace communicates with its chimney, is to be lengthened and carried along under the plate, the plate forming the upper side of the canal. In this kind of sand-bath, digestions, &c. requiring different degrees of heat, may be carried on at once; for the heat decreases gradually from the end over the furnace to the other.

When large vessels, as stills and iron pots for distilling hartshorn and aquafortis, are fixed in furnaces, a considerable part of the bottom of the vessel is commonly made to rest upon solid brick-work.

The large still, whose bottom is narrow in proportion to its height, and whose weight, when charged with liquor, requires great part of it to be thus supported, exposes but a small surface to the action of the fire underneath. To make up for this disadvantage, the heat, which rises at the further end of a long narrow grate, is conveyed all round the sides of the vessel by a spiral canal, which communicates at top with a common chimney.

The pots for distilling hartshorn and aquafortis in

the larger way, have part of their great weight borne up by three strong pins or trunions at equal distances round the pot towards the middle reaching into a brick-work: so that less support being necessary underneath, a greater surface of the wide bottom lies exposed to the immediate action of the fire.

If a furnace, communicating with its chimney by a lateral canal, as in the sand-furnace above-mentioned, be carried to a considerable height above the part where this canal enters it, and if it be filled with fuel to the top, and closely covered, the fuel will burn no higher than up to the upper side of the canal through which the air passes off; and in proportion as this lower part of the fuel consumes, it will be supplied by that above, which falls down in its place. Hence in this furnace, called an *athanor*, a constant heat may be kept up for a considerable length of time without attendance.

The tower of the *athanor*, or that part which receives the fuel, is commonly made to widen a little downwards, that the coals may fall the more freely; but not so much as that the part on fire at bottom may be too strongly pressed. A small aperture is made opposite to the canal or flue, or a number of openings according to the size of the furnace and the degree of heat required, for supplying the air, which is more conveniently admitted in this manner than through the grate, as the interstices of the grate are in time choaked up by the ashes.

This furnace is designed only for heating bodies exterior to it. Its canal or flue, as in the sand-furnace already described, passes under a sand-bath or water-bath; at the farther end of which it rises perpendicularly to such a height, as may occasion a sufficient draught of air through the fire.

The flue may be so wide as to correspond to the whole height of the fire-place. A register or sliding plate, placed between the flue and the furnace, enables us to increase or diminish this height, and consequently the quantity of fire, at pleasure. If the space beneath the flue be inclosed to the ground, the heat in this cavity will be considerable enough to be applicable to some useful purposes.

With regard to the materials of furnaces, the fixed ones are built of bricks, cemented together by some good loam or clay. Any kind of loam or clayey composition that is of a proper degree of tenacity, which, when made into a paste with water and well-worked, does not stick to the fingers, and which, when thoroughly dried, neither cracks nor melts in a vehement fire, is fit for use. The purer and more tenacious clays require to have their tenacity lessened by an admixture of sand, or rather of the same kind of clay burnt and grossly powdered.

Smaller portable furnaces are made of strong iron or copper plates, lined, to the thickness of an inch or more, with the same kind of clayey composition; which for this use may be beaten with some horse-dung, chopped straw, or cut hair or tow.

Very commodious portable furnaces, for a business of moderate extent, may be formed of the larger kind of common black-lead melting-pots, by cutting a door at the bottom of the pot for the ash-pit, another above this for the fire-place, and introducing a circular iron grate of such a size as may rest between the two doors.

Elements.

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Of the materials of which furnaces are made.

For

Elements. For a more particular account of the method of preparing furnaces, see FURNACE.

Elements. flour and water, or of linseed meal (that is, the cake left after the expression of oil of linseed), are sufficient lutes.

BATHS.

64
Of two
kinds of
baths, and
the peculiar
advantages
of each.

Where a strong degree of heat is requisite, as in the fusion of metals, &c. the vessel containing the subject matter is placed among the burning fuel, or immediately over it: this is called *operating in a naked fire*. Where a smaller heat is sufficient, and the vessel employed is either of glass, or of the more tender kinds of earthen ware, the sand-bath or water-bath is used to defend the vessel from the immediate action of the fire, and to render the heat less fluctuating.

Both these baths have their peculiar advantages and inconveniences. In water, the heat is equal through every part of the fluid: whereas in sand it varies in different parts of one perpendicular line, decreasing from the bottom to the top. Water cannot be made to receive, or to transmit to vessels immersed in it, above a certain degree of heat, viz. that which is sufficient to make it boil; and hence it secures effectually against any danger of an excess of heat in those operations wherein the product would be injured by a heat greater than that of boiling water: but this advantage renders it useless for processes which require a greater heat, and for which sand or other solid intermedia are necessarily employed. There is this convenience also in the sand-bath, that the heat may be readily diminished or increased about any particular vessel, by raising it higher out of the sand or sinking it deeper; that different subjects may be exposed to different degrees of heat from one fire; and that it keeps the vessels steady. The sand made choice of should be a large coarse grained kind, separated from the finer parts by washing, and from little stones by the sieve.

COATING OF GLASSES, LUTES.

65
In some o-
perations
glass vessels
are used in
a naked fire.

Some processes require to be performed with glass vessels in a naked fire. For these purposes, vessels made of the thinnest glass should be chosen; for these bear the fire without cracking, much better than those which are thicker, and in appearance stronger.

All glasses, or other vessels that are apt to crack in the fire, must be cautiously nealed, that is, heated by slow degrees: and when the process is finished, they should be as slowly cooled, unless where the vessel is to be broken to get out the preparation, as in some sublimations: in this case it is more advisable to expose the hot glass suddenly to the cold air, which will soon occasion it to crack, than to endanger throwing down the sublimated matter among the feces by a blow.

66
Of the coat-
ing of glass
vessels.

As a defence from the violence of the fire, and to prevent the contact of cold air on supplying fresh fuel, &c. the glass is to be coated over, to the thickness of about half-a-crown, with Windsor loam, softened with water into a proper consistence, and beaten up with some horse-dung, or with the other clayey compositions above-mentioned.

These compositions serve also as a lute, for securing the junctures of the vessels in the distillation of the volatile salts and spirits of animals: for the distillation of acid spirits, the matter may be moistened with a solution of fixed alkaline salt instead of water. For most other purposes, a piece of wet bladder, or paste of

Sometimes clay and chalk are mixed up into a paste, and spread upon slips of paper; and sometimes gum-arabic is used instead of the clay, and mixed up in the same manner.

Wet bladders contract so strongly by drying, that they not unfrequently break the vessels: and the fat lute of Mr Macquer, which is a composition of clay and chalk with oil, is too close for most operations. Where very elastic steams are to be condensed, we are often obliged, even where the common lutes are employed, to leave or make an opening which may be occasionally stopped by a plug: by this means we give passage to a part of these vapours, which prevents the bursting of the vessels and facilitates the condensation of the rest. If we wish to collect incondensable vapours, we receive them into a jar inverted under a basin of water, or quicksilver, as is usually done in the analysis of vegetables by fire.

Besides these, there are also required some other kinds of lutes for joining vessels together in operations requiring a strong heat, and for lining furnaces; for which see CHEMISTRY, n° 604, 605.

VESSELS.

In this place, we shall only give the operator a few general cautions with regard to the matter of the vessels designed for containing the subject; and refer their description, to the account of the operations in which they are employed. See likewise CHEMISTRY, n° 557, &c.

Metalline vessels possess the advantage of being able to bear sudden alterations of heat and cold, and of being very strong, so as to be capable of confining elastic steams; but, except those made of gold or silver, they are readily corroded by acids, even by the mild ones of the vegetable kingdom. Copper vessels are corroded also by alkaline liquors, and by some neutral ones, as solutions of sal ammoniac. It is observable, that vegetable acids do not act upon this metal by boiling, so much as by standing in the cold; for even lemon juice may be boiled in a clean copper vessel, without receiving from it any taste or ill quality; whereas, in the cold, it soon dissolves so much as to contract a pernicious taint. The tin, with which copper-vessels are usually lined, gives likewise a sensible impregnation to acid juices; and this impregnation also is probably not innocent, more especially as a quantity of lead is commonly mixed with the tin. From the want of transparency in these vessels, we are also deprived of the advantage of seeing the different changes during the operation.

The earthen vessels possess none of the desirable qualities for chemical operations, except that of sustaining very violent degrees of heat, without being melted or otherwise changed. These vessels are less liable to external cracks from sudden applications of heat and cold, when they are made with a certain proportion of sand, than with pure clay. Black lead, too, mixed with the clay, makes the vessels sustain violent degrees and sudden alterations of heat surprisingly well: crude clay, reduced to a kind of sand by violent heat, and then mixed with raw clay, is also found to furnish vessels excellently fitted for those operations where

67
Cautions
respecting
the matter
of other
vessels.

Elements. where sand might be corroded: but of all kinds of earthen ware, the most perfect is porcelain, composed of the finest clay mixed with a stony matter capable of melting in a violent heat. This, however, is too costly an article for general use. Reaumur discovered a method of imitating porcelain, by melting the coarser kinds of glass with a mixture of sand and clay: this has been found to be nearly of the colour of porcelain, to be much stronger than glass, and to bear the most sudden changes of heat and cold that we have occasion to apply. There has not hitherto been any manufacture of this ware, and of course it has not come into general use.

The common earthen vessels are of a loose porous texture; and hence are apt to imbibe a considerable quantity of certain liquids, particularly of those of the saline kind; which soon discover that they have penetrated the vessel, by shooting into saline efflorescences on the outside. Those which are glazed have their glazing corroded by acids: by vinegar, and the acid juices of fruits, as well as by the stronger acids of the mineral kingdom. And as this glazing consists chiefly of vitrified lead, the impregnation which it communicates to these liquors is of a very dangerous kind. If vinegar be boiled for some time in a glazed earthen vessel, it will yield, on being inspissated, a pure sal plumbi, that is, a salt composed of lead and the acetic acid.

The vessels called, from their hardness and compactness, *stone ware*, are in a good measure free from the inconveniences of the coarser earthen ones. Their glazing being a part of the clay itself, superficially vitrified by means of the fumes of common salt, appears to be proof against acids.

Glass vessels suffer no corrosion, and give no taint, in any of the pharmaceutic operations. When, therefore, they are made of a proper thinness, when they are well annealed, and when blown into a spherical form so that the heat may be equally applied, they are preferable to all others, where great and sudden changes of heat and cold are not to take place, and where strength is not required: what is called the *flint glass*, which contains a quantity of lead in its composition, is the best for chemical purposes.

WEIGHTS.

68 Two kinds of weights are made use of in this country; one in the merchandise of gold and silver; the other for almost all other goods. The first we call Troy, the latter Avoirdupois weight.

The goldsmiths divide the Troy pound into twelve ounces; the ounce into 20 pennyweights; and the pennyweight into 24 grains. The Avoirdupois pound is divided into 16 ounces; and the ounce into 16 parts, called *drams*.

The pound of the London and Edinburgh dispensaries is that of the goldsmiths, divided in the following manner:

The pound	} contains	twelve ounces.
The ounce		eight drams.
The dram		three scruples.
The scruple		twenty grains.
The grain is equal to the goldsmith's grain.		

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The medical or Troy pound is less than the Avoirdupois, but the ounce and the dram greater. The Troy pound contains 5760 grains: the Avoirdupois 7000 grains. The Troy ounce contains 480 grains; the Avoirdupois only 437½. The Troy dram 60; the Avoirdupois dram somewhat more than 27. Eleven drams Avoirdupois are nearly equal to five drams Troy; 12 ounces Avoirdupois to nearly 11 ounces Troy; and 19 pounds Avoirdupois are equal to somewhat more than 23 pounds Troy.

These differences in our weights have occasioned great confusion in the practice of pharmacy. As the druggists and grocers sell by the Avoirdupois weight, the apothecaries have not in general kept any weights adjusted to the Troy pound greater than two drams, using Avoirdupois ounces. By this means it is apparent, that in all compositions, where the ingredients are prescribed, some by pounds and others by ounces, they are taken in a wrong proportion to each other; and the same happens where any are directed in lesser denominations than the ounce, as these subdivisions used by the apothecaries are made to a different ounce.

MEASURES.

The measures employed in pharmacy are the common wine measures.

A gallon	} contains	eight pints (<i>libra</i> .)
The pint		sixteen ounces.
The ounce		eight drams.

69 The measures used in pharmacy the same with those commonly used for wine.

Though the pint is called by Latin writers *libra* or pound, there is not any known liquor of which a pint measure answers to that weight. A pint of the highest rectified spirit of wine exceeds a pound by above half an ounce; a pint of water exceeds it by upwards of three ounces; and a pint of oil of vitriol weighs more than two pounds and a quarter.

The Edinburgh College, sensible of the many errors from the promiscuous use of weights and measures, and of their different kinds, have in the last edition of their Pharmacopœia entirely rejected measures, and employ the Troy weight in directing the quantity either of solid or fluid substances. They have, however, taken all possible care that the proportion of the simples and strength of the compounds should neither be increased nor diminished by this alteration. This change in the Edinburgh Pharmacopœia must be very particularly adverted to. And it is, we think, to be regretted, that the London College have not in the last edition of their Pharmacopœia followed the same plan.

70 A table of the weights of certain measures of different fluids may on many occasions be useful, both for assisting the operator in regulating their proportions in certain cases, and showing the comparative gravities of the fluids themselves. We here insert such a table for a pint, an ounce, and a dram measure, of those liquids whose gravity has been determined by experiments that can be relied on. The wine gallon contains 231 cubic inches; whence the pint contains 28¾, the ounce 1½, and the dram ¾ of a cubic inch.

P p

INFLAM.

SECT. I. SOLUTION.

SOLUTION is an intimate commixture of solid bodies with fluids into one seemingly homogeneous liquor. The dissolving fluid is called a *menstruum* or *solvent*; and the body dissolved is called the *solvend*.

Objections have been made, and perhaps with propriety, to these terms; as it is supposed that the two bodies uniting in solution act reciprocally on each other: there is, however, no danger from the words themselves, if we do not derive them from a mistaken theory. Solution cannot take place, unless one of the bodies, at least, be in a fluid state; and this fluidity is effected either by water or fire: hence solution is said to be performed in the *humid* or in the *dry way*. Thus, for instance, if any quantity of brimstone be dissolved in a solution of fixed alkali, the brimstone is said to be dissolved in the *humid way*: but if the brimstone be dissolved by melting it in a pan with the dry alkali, the solution is said to be done in the *dry way*. The *hepar sulphuris* is the same in both. Another kind of solution resembling that by the dry way, is, however, to be carefully distinguished from it: if, for example, a piece of Glauber's salt is put into a pan over the fire, the salt very soon assumes a liquid state; but on continuing the heat, it loses its fluidity, and becomes a white powder: this powder is the salt freed from its water, and it is found to be very refractory. This liquidity depended on the water of crystallization being enabled by the heat to keep the salt in solution, and the salt ceased to be fluid as soon as its crystallizing water was evaporated. This kind of solution, then, differs not from the first, or humid way.

If one of the two bodies to be united is transparent, the solution, if complete, is a transparent compound: this is the case in solutions of alkalis and calcareous earths in acids. But if the solution be opaque and milky, as is the case with soap and water, it is then considered as incomplete.

The principal *menstrua* used in pharmacy are, *water*, *vinous spirits*, *oils*, *acid* and *alkaline liquors*.

Water is the *menstruum* of all salts, of vegetable gums, and of animal gellies. Of salts, it dissolves only a determinate quantity, though of one kind of salt more than another; and being thus *saturated*, leaves any additional quantity of the same salt untouched.

Experiments have been made for determining the quantities of water which different salts require for the dissolution. Mr Eller has given a large set in the *Memoirs of the Royal Academy of Sciences of Berlin* for the year 1750, from which the following table is extracted.

Eight ounces by weight of distilled water dissolved.

	oz.	dr.	gr.
Of refined sugar	24	0	0
Green vitriol	9	4	0
Blue vitriol	9	0	0
White vitriol	4	4	0
Epsom salt	4	0	0
Purified nitre	4	0	0
Soluble tartar	4	0	0
Common salt	3	4	0
Sal gemmæ	3	4	0

Sal

INFLAMMABLE SPIRITS.

Æthereal spirit of wine	11	1	36	336	42
Highly-rectified spirit of wine	12	5	20	380	47½
Common-rectified spirit of wine	13	2	40	400	50
Proof spirit	14	1	36	426	53¼
Dulcified spirit of salt	14	4	48	438	55¼
Dulcified spirit of nitre	15	2	40	460	57½

WINES.

Burgundy	14	1	36	426	53¼
Red port	15	1	36	456	57
Canary	15	6	40	475	59½

EXPRESSED OILS.

Oil olive	14	0	0	420	52½
Linseed oil	14	2	8	428	53½

ESSENTIAL OILS.

Oil of turpentine	12	1	4	364	45½
of orange-peel				408	51
of juniper-berries				419	52¾
of rosemary				430	53¾
of origanum				432	54
of caraway seeds				432	54
of nutmegs				436	54½
of favin				443	55½
of hyssop				443	55½
of cummin-feed				448	56
of mint				448	56
of pennyroyal				450	56¼
of dill-feed				457	57½
of fennel-feed				458	57¼
of cloves				476	59½
of cinnamon				576	49½
of saffrafas				503	62¾

ALKALINE LIQUORS.

Aqua kali puri, Pharm. Lond.	16	0	0	480	60
Spirit of sal ammoniac	17	1	10	514¾	64½
Strong soap-boilers ley	17	6	24	534	66¾
Lixivium tartari	24	0	0	720	90

ACID LIQUORS.

Wine-vinegar	15	3	44	464	58
Beer-vinegar	15	6	56	476	59½
Glauber's spirit of salt	17	4	0	525	65½
Glauber's spirit of nitre	20	2	40	610	76¼
Strong oil of vitriol	28	5	20	860	107½

ANIMAL FLUIDS.

Urine	15	5	20	470	58¾
Cows milk	15	6	40	475	59¾
Asses milk	16	0	0	480	60
Blood	16	1	4	484	60½

WATERS.

Distilled water	15	1	50	456¾	57
Rain-water	15	2	40	460	57½
Spring-water	15	3	12	462	57¾
Sea-water	15	5	20	470	58¾

QUICKSILVER.

1214	5	20	6440	805
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Elements.

Sal catharticus Glauberi	3	4	0
Seignette's salt	3	0	0
Alum	2	4	0
Sal ammoniac	2	4	0
Vitriolated tartar	1	4	0
Salt of hartshorn	1	4	0
Sugar of lead	1	2	0
Cream of tartar	1	0	0
Borax	0	4	20

Though great care appears to have been taken in making these experiments, it is not to be expected that the proportions of the several salts, soluble in a certain quantity of water, will always be found exactly the same with those above set down. Salts differ in their solubility according to the degree of their purity, perfection, and dryness: the vitriols, and the artificial compound salts in general, differ remarkably in this respect, according as they are more or less impregnated with the acid ingredient. Thus vitriolated tartar; perfectly neutralized, is extremely difficult of solution: the matter which remains in making Glauber's spirit of nitre is no other than a vitriolated tartar; and it dissolves so difficultly, that the operator is obliged to break the retort in order to get it out; but on adding more of the vitriolic acid, it dissolves with ease. Hence many have been tempted to use an over-proportion of acid in this preparation: and we frequently find in the shops, under the name of vitriolated tartar, this acid soluble salt. The degree of heat occasions also a remarkable difference in the quantity of salt taken up: in very cold weather, 8 ounces of water will dissolve only about one ounce of nitre; whereas in warm weather, the same quantity will take up three ounces or more. To these circumstances are probably owing, in part, the remarkable differences in the proportionable solubilities of salts, as determined by different authors. It is observable that common salt is less affected in its solubility by a variation of heat than any other; water in a temperate state dissolving nearly as much of it as very hot water: and accordingly this is the salt in which the different experiments agree the best. In the experiments of Hoffmann, Neumann, and Petit, the proportion of this salt, on a reduction of the numbers, comes on exactly the same, viz. three ounces of the salt to eight of water; Dr Brownrigg makes the quantity of salt a little more; Dr Grew, a dram and a scruple more; and Eller, as appears in the above table, four drams more: so that in the trials of six different persons, made probably in different circumstances, the greatest difference is only one sixth of the whole quantity of salt; whereas in some other salts there are differences of twice or thrice the quantity of the salt. In the experiments from which the table is drawn, the water was of the temperature of between 40 and 42 degrees of Fahrenheit's thermometer, or above freezing by about one-seventh of the interval between freezing and the human heat.

Some salts omitted by Eller are here subjoined; the first is taken from Dr Grew, and the other four from Neumann.

Eight ounces of water dissolved,		
	oz.	dr. gr.
Of fixed alkaline salt	above 8	0 0
Sal diureticus	8	0 0

Sugar-candy, both brown and white	9	0	0
Sugar of milk	0	2	40
Essential salt of sorrel	0	1	20

Elements.

Though water takes up only a certain quantity of one kind of salt, yet when saturated with one, it will still dissolve some portion of another; and when it can bear no more of either of these, it will still take up a third, without letting go any of the former. The principal experiments of this kind which have been made relative to pharmaceutic subjects, are exhibited in the following table; of which the two first articles are from Grew, and the others from Eller.

Water, 32 parts by weight,			
Fully saturated with		dissolved afterwards	
Nitre	Sal ammoniac	10	
Common salt	Nitre	10	Sal ammoniac 2
Nitre	Fixed alkali	7	Common salt 2
Common salt	Nitre, near	2	Fixed alkali 2½
Volatile alkali	Nitre	4	Sugar 2
Sal ammoniac	Common salt	2½	
Soluble tartar	Nitre	2	
Vitriolated tartar	Fixed alkali	2	
Glauber's salt	Nitre	1	Sugar 1
Epsom salt	Sugar	6	
Borax	Fixed alkali	2	

In regard to the other class of bodies for which water is a menstruum, viz. those of the gummy gelatinous kind, there is no determinate point of saturation: the water unites readily with any proportions of them, forming with different quantities liquors of different consistence. This fluid takes up likewise, when assisted by trituration, the vegetable gummy resins, as ammoniacum and myrrh; the solutions of which, though imperfect, that is, not transparent, but turbid and of a milky hue, are nevertheless applicable to valuable purposes in medicine. It mingles with vinous spirits, with acid and alkaline liquors, not with oils, but imbibes some of the more subtle parts of essential oils, so as to become impregnated with their smell and taste.

Rectified spirit of wine, or rather alcohol, is the menstruum of the essential oils and resins of vegetables; of the pure distilled oils, and several of the colouring and medicinal parts of animals; of some mineral bituminous substances, as of ambergris; and of soaps, though it does not act upon the expressed oil and fixed alkaline salt, of which soap is composed: whence, if soap contains any superfluous quantity of either the oil or salt, it may by means of this menstruum be excellently purified. It dissolves, by the assistance of heat, volatile alkaline salts; and more readily the neutral ones, composed either of fixed alkali and the acetic acid, as the sal diureticus, or of the volatile alkali and the nitrous acid, as also the salt of amber, &c. It mingles with water and with acids; not with alkaline lixivium.

Oils dissolve vegetable resins and balsams, wax, animal-fats, mineral bitumens, sulphur, and certain metallic substances, particularly lead. The expressed oils are, for most of these bodies, more powerful menstrua than those obtained by distillation; as the former are more capable of sustaining, without injury, a strong heat, which is in most cases necessary to enable them to act. It is said, that one ounce of sulphur will dissolve in three ounces of expressed oil, particularly lin-

Elements.

75
All acids
dissolve al-
kaline salts,
alkaline
earths, and
metallic
substances.

feed oil; but requires six ounces of essential oil, as turpentine.

All acids dissolve alkaline salts, alkaline earths, and metallic substances. The different acids differ greatly in their action upon these last; one dissolving only some particular metals; and another, others.

The *vegetable* acids dissolve a considerable quantity of zinc, iron, copper, lead, and tin; and extract so much from the metallic part of antimony, as to become powerfully emetic: they dissolve lead more readily, if the metal be previously calcined by fire, than in its metallic state.

The *marine* acid dissolves zinc, iron, and copper; and though it scarcely acts on any other metallic substance in the common way of making solutions, it may nevertheless be artfully combined with them all except gold. The corrosive sublimate, and antimonial caustic of the shops, are combinations of it with mercury and the metallic part of antimony, effected by applying the acid, in the form of fume, to the subjects, at the same time also strongly heated.

The *nitrous* acid is the common menstruum of all metallic substances, except gold and the metallic part of antimony; of which two, the proper solvent is a mixture of the nitrous and marine acids, called *aqua regia*.

The *vitriolic* acid, diluted with water, easily dissolves zinc and iron. In its concentrated state, and assisted by a boiling heat, it may be made to corrode, or imperfectly dissolve, most of the other metals.

The aerial acid dissolves iron, zinc, and calcareous earth; and those solutions must be conducted without heat.

76
Alkaline
lixivia dis-
solves oils,
resinous
substances,
and sul-
phur.

Alkaline *lixivia* dissolve oils, resinous substances, and sulphur. Their power is greatly promoted by the addition of quicklime; instances of which occur in the preparation of soap, and in the common caustic. Thus acuated, they reduce the flesh, bones, and other solid parts of animals, into a gelatinous matter. This increased acrimony in alkaline salts is owing to the abstraction of their fixed air; that acid having a greater attraction for quicklime than for alkalis.

Solutions made in water and in spirit of wine possess the virtues of the body dissolved; while oils generally sheath its activity, and acids and alkalis vary its quality. Hence watery and spirituous liquors are the proper menstrua of the native virtues of vegetable and animal matters.

Most of the foregoing solutions are easily effected, by pouring the menstruum on the body to be dissolved, and suffering them to stand together for some time exposed to a suitable warmth. A strong heat is generally requisite to enable oils and alkaline liquors to perform their office; nor will acids act on some metallic bodies without its assistance. The action of watery and spirituous menstrua is likewise expedited by a moderate heat; though the quantity which they afterwards keep dissolved is not, as some suppose, by this means increased: all that heat occasions these to take up, more than they would do in a longer time in the cold, will, when the heat ceases, subside again. This at least is most commonly the case, though there may be some instances of the contrary.

The action of acids on the bodies which they dissolve, is generally accompanied with heat, effervescence,

and a copious discharge of fumes. The fumes which arise during the solution of some metals in the vitriolic acid, prove inflammable: hence in the preparation of the artificial vitriols of iron and zinc, the operator ought to be careful, especially where the solution is made in a narrow mouthed vessel, lest by the imprudent approach of a candle the exhaling vapour be set on fire. This vapour is the inflammable air of Dr Priestley and other modern chemists.

There is another species of solution, in which the moisture of the air is the menstruum. Fixed alkaline salts, and those of the neutral kind, composed of alkaline salts and the vegetable acids, or of soluble earths and any acid, except the vitriolic, and some metallic salts, on being exposed for some time to a moist air, gradually attract its humidity, and at length become liquid. Some substances, not dissoluble by the application of water in its grosser form, as the butter of antimony, are easily liquefied by this slow action of the aerial moisture. This process is called *deliquation*.

SECT. II. EXTRACTION.

THE liquors which dissolve certain substances in their pure state, serve likewise to *extract* them from admixtures of other matter. Thus ardent spirit, the menstruum of essential oils and resins, takes up the virtues of the resinous and oily vegetables, as water does those of the mucilaginous and saline; the inactive earthy parts remaining untouched by both. Water extracts likewise from many plants, substances which by themselves it has little effect upon; even essential oils being, as we have formerly observed, rendered soluble in that fluid by the admixture of gummy and saline matter, of which all vegetables participate in a greater or less degree. Thus many of the aromatic plants, and most of the bitters and astringents, yield their virtues to this menstruum.

Extraction is performed, by *macerating* or *steeping* the subject in its appropriated menstruum in the cold: or *digesting* or *circulating* them in a moderate warmth; or *infusing* the plant in the boiling liquor, and suffering them to stand in a covered vessel till grown cold; or actually *boiling* them together for some time. If the vegetable matter is itself succulent and watery, it is sometimes only necessary to express the juice, and evaporate it to the proper consistence.

The term *digestion* is sometimes used for maceration; and in this case the process is directed to be performed *without heat*: where this circumstance is not expressed, digestion always implies the use of heat. Circulation differs from digestion only in this, that the steam, into which a part of the liquor is resolved by the heat, is, by means of a proper disposition of the vessels, condensed and conveyed back again upon the subject. Digestion is usually performed in a matrass (or bolt-head), Florence flask, or the like; either of which may be converted into a circulatory vessel, by inverting another into the mouth, and securing the juncture with a piece of wet bladder. A single matrass, if its neck be very long and narrow, will answer the purpose as effectually; the vapour cooling and condensing before it can rise to the top: in a vessel of this kind, even spirit of wine, one of the most volatile liquors we know, may be boiled without any considerable loss: the use of this instru-

Elements.

77
Those li-
quors
which dis-
solve sub-
stances are
also useful
for extract-
ing them
from ad-
mixtures of
other mat-
ter.

78
Methods of
performing
extraction.

Elements. instrument is likewise free from an inconvenience which may in some cases attend the other, of the uppermost vessel being burst or thrown off. As the long necked matrasses here recommended are difficultly filled or emptied, and likewise very dear, a long glass pipe may be occasionally luted to the shorter ones.

Heat greatly expedites extraction; but by this means proves as injurious to some substances, by occasioning the menstruum to take up their grosser and more ungrateful parts, as it is necessary for enabling it to extract the virtues of others. Thus guaiacum and logwood impart little to aqueous liquors without a boiling heat; whilst even a small degree of warmth proves greatly prejudicial to the fine bitter of carduus benedictus. This plant, which infused in boiling, or digested in sensibly hot water, gives out a nauseous taste, so offensive to the stomach as to promote vomiting, yields to the cold element a grateful balsamic bitter.

As heat promotes the dissolving power of liquids; so cold, on the other hand, diminishes it. Hence tinctures or extractions made by a considerable heat, deposit in cold weather a part of their contents, and thus become proportionally weaker: a circumstance which deserves particular regard.

SECT. III. DEPURATION.

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Various
methods of
depurating
or puri-
fying li-
quors.
THERE are different methods of depurating or purifying liquors from their feculencies, according as the liquor itself is more or less tenacious, or the feculent matter of greater or less gravity.

Thin fluids readily deposit their more ponderous impurities upon standing at rest for some time in a cool place; and may then be decanted or poured off clear, by inclining the vessel.

Glutinous, unctuous, or thick substances, are to be liquefied by a suitable heat; when the grosser feculencies will fall to the bottom, the lighter arising to the surface to be *despumated* or skimmed off.

Where the impurities are neither so ponderous as to subside freely to the bottom, nor so light as to arise readily to the surface, they may be separated in great measure by *colature* through strainers of linen, woollen, or other cloth; and more perfectly by *filtration* through a soft bibulous kind of paper made for the purpose.

The grey paper, which covers pill-boxes as they come from abroad, is one of the best for this purpose: it does not easily break when wetted, or tinge the liquor which passes through it, which the reddish sort called *blossom paper* frequently does. The paper is supported by a funnel or piece of canvas fixed in a frame. When the funnel is used, it is convenient to put some straws or small sticks between the paper and its sides, to prevent the weight of the liquor from pressing the paper so close to it, as not to allow room for the fluid to transude. In some cases a funnel made of wire is put between the paper and the glass funnel. There is also a kind of glass funnel with ridges down its sides made on purpose for this use.

Glutinous and unctuous liquors, which do not easily pass through the pores of a filter or strainer, are clarified by beating them up with whites of eggs; which concreting and growing hard when heated, and entangling the impure matter, arise with it to the surface: the mixture is to be gently boiled till the scum begins to break, when the vessel is to be removed from

the fire, the crust taken off, and the liquor passed thro' a flannel bag.

Decantation, colature, and filtration, are applicable to most of the medicated liquors that stand in need of purification. Despumation and clarification very rarely have place; since these, along with the impurities of the liquor, frequently separate its medicinal parts. Thus, if the decoction of poppy heads, for making diacodium, be solicitously skimmed or clarified, the medicine will lose almost all that the poppies communicated; and instead of a mild opiate, turns out little other than a plain syrup of sugar.

It may be proper to observe, that the common sorts of filtering paper are apt to communicate a disagreeable flavour: and hence in filtering fine bitters or other liquors, whose gratefulness is of primary consequence, the part which passes through first ought to be kept apart for inferior purposes.

SECT. IV. CRYSTALLIZATION.

80
Causes, na-
ture, and
method, of
crystalli-
zation.
WATER, assisted by heat, dissolves a larger proportion of most saline substances than it can retain when grown cold; hence, on the abatement of the heat, a part of the salt separates from the menstruum, and concretes at the sides and bottom of the vessel. The concretions, unless too hastily formed by the sudden cooling of the liquor, or disturbed in their coalescence by agitation, or other similar causes, prove transparent and of regular figures, resembling in appearance the natural spring-crystals.

Salts, dissolved in a large quantity of water, may in like manner be recovered from it in their crystalline form, by boiling down the solution, till so much of the fluid has exhaled as that the remainder will be too little to keep the salt dissolved when grown perfectly cold. It is customary to continue the evaporation till the salt shows a disposition to concrete even from the hot water, by forming a pellicle on that part which is least hot, *viz.* on the surface. If large, beautiful, and perfectly figured crystals are required, this point is somewhat too late: for if the salt thus begins to coalesce whilst considerably hot, on being removed into a cold place its particles will run too hastily and irregularly together: the pellicle at the same time falling down through the liquor, proves a farther disturbance to the regularity of the crystallization.

In order to perform this process in perfection, the evaporation must be gentle, and continued no longer than till some drops of the liquor, let fall on a cold glass-plate, discover crystalline filaments. When this mark of sufficient exhalation appears, the vessel is to be immediately removed from the fire into a less warm but not cold place, and covered with a cloth to prevent the access of cold air, and consequently the formation of a pellicle.

The fixed alkalis, especially the mineral, when fully saturated with fixed air or the aerial acid, assume a crystalline form; but these crystals are not so perfect as when the same alkalis are united with the other acids; the volatile alkalis cannot crystallize, because they escape before the menstruum exhales.

Some even of the other neutral salts, particularly those of which certain metallic bodies are the basis, are so strongly retained by the aqueous fluid, as not to exhibit any appearance of crystallization, unless some other

Elements.

Elements.

other substance be added, with which the water has a greater affinity. The Table of Affinity shows that spirit of wine is such a substance; by the prudent addition of which, these kinds of salt separate freely from the menstruum, and form large and beautiful crystals scarcely obtainable by any other means.

The operator must be careful not to add too much of the spirit; lest, instead of a gradual and regular crystallization, the basis of the salt be hastily precipitated in a powdery form. One-twentieth part of the weight of the liquor will in most cases be a sufficient, and in some too large a quantity.

Different salts require different quantities of water to keep them dissolved: and hence, if a mixture of two or more be dissolved in this fluid, they will begin to separate and crystallize at different periods of the evaporation. Upon this foundation, salts are freed not only from such impurities as water is not capable of dissolving and carrying through the pores of a filter, but likewise from admixtures of each other; that which requires most water to dissolve shooting first into crystals.

It is proper to remark, that a salt, when crystallizing, still retains and combines with a certain portion of water: this water is not essential to the salt as a salt, but is essential to a salt as being crystallized; it is therefore called by the chemists the *water of crystallization*. The quantity of this water varies in different salts: In some of them, as in Glauber's salt, alum, and copperas, it makes up about one half of their weight; in others, as in nitre, common salt, and especially selenites, it is in very small quantity. As salts unite to the water of their crystallization by their attraction for water alone, we accordingly find that this water is perfectly pure, and contains, in complete crystals, no substance foreign to the salt. Salts not only differ in the quantity of water necessary to their solution, but some of them are also soluble with equal facility in cold as in hot water. Sometimes then we employ evaporation; sometimes cooling; and at other times both these expedients are used alternately, to separate different salts dissolved in the same liquor. It is obvious, then, that those which are nearly or equally soluble in cold as in boiling water, can only be crystallized by evaporation; those again, which are much more soluble in boiling than in cold water, are to be separated by cooling. Of the first of these is common or marine salt; of the latter is nitre or saltpetre. It remains, then, that we should know how to separate these two salts, when both of them happen to be dissolved in the same water; this method consists in alternate evaporation and cooling. If in such a solution a pellicle appears in the boiling liquor before crystals can be formed in the cooling, we then conclude that the common salt predominates: In this case we evaporate the water, and separate the common salt as fast as it is formed, till the liquor on cooling shows crystals of nitre: we then allow the nitre to crystallize by cooling. After all the nitre which had been dissolved by the heat alone has now separated by cooling, we resume the evaporation, and separate the common salt till the cooling liquor again shows crystals of nitre. We thus repeat the same series of operations, by which means these two salts may be alternately crystallized; the one by evaporation, the other by cooling, till they

are perfectly separated from each other. If in the beginning of the operation the liquor had, upon trial, given crystals of nitre by cooling, before any pellicle appeared on its surface when boiling, this would have indicated that the nitre was predominant in the solution; the nitre in this case would have been crystallized, first by cooling, till the quantity of nitre exceeding that of the common salt having been separated, the common salt would next have crystallized in its turn by evaporation. The example we have now given may be applied to other salts, or to a number of salts which may happen to be dissolved in the same liquor. For though there are few so completely soluble in cold water as common salt, and few so scantily as nitre; yet there are scarcely two salts which either precisely show the same solubility or the same appearance of their crystals. It is obvious, too, that by crystallization we discover the peculiar predominant salt in any solution of mixed saline matter; but as one salt always takes down a small portion of another, it is necessary to redissolve the first products, and repeat the crystallization, in order to render the separation complete.

We see, then, that though the crystal appearance and form does not alter the salt itself, yet that this process affords an elegant method of discovering compound solutions of salts, of judging of their purity, and lastly of separating different salts very completely from each other. Crystallization, then, is one of the most important agents in pharmacy, and ought to be well understood. We shall attempt to explain the particular management in crystallizing particular salts, when we come to treat of each of them separately.

SECT. V. PRECIPITATION.

By this operation bodies are recovered from their solutions by means of the addition of some other substance, with which either the menstruum or the body dissolved have a greater affinity than they have with each other.

Precipitation, therefore, is of two kinds; one, where the substance superadded unites with the menstruum, and occasions that before dissolved to be thrown down; the other, in which it unites with the dissolved body, and falls along with it to the bottom. Of the first, we have an example in the precipitation of sulphur from alkaline lixivium by the means of acids; of the second, in the precipitation of mercury from aquafortis by sea-salt, or its acid.

The subjects of this operation, as well those which are capable of being precipitated as those which precipitate them, will readily appear from inspection of the Table of Affinity. See CHEMISTRY, page 438. The manner of performing it is so simple, as not to stand in need of any particular directions; no more being required than to add the precipitant by degrees as long as it continues to occasion any precipitation. When the whole of the powder has fallen, it is to be well *edulcorated*, that is, washed in several fresh parcels of water, and afterwards dried for use.

Where metals are employed as precipitants, as in the purification of martial vitriol from copper by the addition of fresh iron, they ought to be perfectly clean and free from any rusty or greasy matter; otherwise they will not readily, if at all, dissolve, and consequently

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Nature of
precipitation; and
various
methods
of performing
this
operation.

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ly the precipitation will not succeed; for the substance to be precipitated separates only by the additional one dissolving and taking its place. The separated powder often, instead of falling to the bottom, lodges upon the precipitant; from which it must be occasionally shaken off, for reasons sufficiently obvious.

Though in this operation the precipitated powder is generally the part required for use, yet some advantage may frequently be made of the liquor remaining after the precipitation. Thus when fixed alkaline salt is dissolved in water, and sulphur dissolved in this lixivium, the addition of acids separates and throws down the sulphur only in virtue of the acid uniting with and neutralizing the alkali by which the sulphur was held dissolved; consequently, if the precipitation be made with the vitriolic acid, and the acid gradually dropt in till the alkali be completely fatiated, that is, as long as it continues to occasion any precipitation or turbidness, the liquor will yield, by proper evaporation and crystallization, a neutral salt, composed of the vitriolic acid and fixed alkali, that is, vitriolated tartar. In like manner, if the precipitation be made with the nitrous acid, a true nitre may be recovered from the liquor; if with the marine, the salt called *spiritus salis marini coagulatus*; and if with the acid of vinegar, the *sal diureticus*.

SECT. VI. EVAPORATION.

EVAPORATION, the third method of recovering solid bodies from their solutions, is effected by the means of heat; which evaporating the fluid part, that is, forcing it off in steam, the matter which was dissolved therein is left behind in its solid form.

The general rules for evaporation are, to place the matter in a flat, shallow, wide vessel, so that a large surface of the liquor may be presented to the air; for it is only from the surface that evaporation takes place. The degree of heat ought to be proportioned to the volatility of the substance to be evaporated, and to the degree of the fixity of the matter to be left: thus, the less fixed the matter to be left is, and the more strongly it adheres to the volatile parts, the less the degree of heat ought to be; and in such cases, too, a forcible current of air is sometimes scarcely admissible: on the contrary, when the matter to be evaporated is not very volatile, and when the matter to be left is very fixed, and does not adhere strongly to the volatile part, the evaporation may be urged by a strong heat, aided by a current of air directed upon the surface of the liquor.

This process is applicable to the solutions of all these substances which are less volatile than the menstruum, or which will not exhale by the heat requisite for the evaporation of the fluid; as the solutions of fixed alkaline salts; of the gummy, gelatinous, and other inodorous parts of vegetables and animals in water; and of many resinous and odorous substances in spirit of wine.

Water extracts the virtues of sundry fragrant aromatic herbs, almost as perfectly as rectified spirit of wine; but the aqueous infusions are far from being equally suited to this process with those made in spirit, water carrying off the whole odour and flavour of the subject which that lighter liquor leaves entire behind it. Thus a watery infusion of mint loses in evaporation the smell, taste, and virtues, of the herb; whilst a tincture drawn with pure spirit yields on the same treat-

ment a thick balsamic liquor, or solid gummy resin, extremely rich in the peculiar qualities of the mint.

In evaporating these kinds of liquors, particular care must be had, towards the end of the process, that the heat be very gentle; otherwise the matter as it grows thick will burn to the vessel, and contract a disagreeable smell and taste: this burnt flavour is called *empyreuma*. The liquor ought to be kept stirring during the evaporation; otherwise a part of the matter concretes on the surface exposed to the air, and forms a pellicle which impedes the farther evaporation.

SECT. VII. DISTILLATION.

IN the foregoing operation fluids are rarefied by heat into steam or vapour, which is suffered to exhale in the air, but which it is the business of distillation to collect and preserve. For this purpose the steam is received in proper vessels, luted to that in which the subject is contained; and being there cooled, condenses into a fluid form again.

There are two kinds of distillation; by the one, the more subtle and volatile parts of liquors are elevated from the grosser; by the other, liquids incorporated with solid bodies are forced out from them with vehemence by fire.

To the first belong the distillation of the pure inflammable spirit from vinous liquors; and of such of the active parts of vegetables as are capable of being extracted by boiling water or spirit, and at the same time of arising along with their steam.

As boiling water extracts or dissolves the essential oils of vegetables, while blended with the other principles of the subject, without saturation, but imbibes only a determinate, and that a small proportion of them, in their pure state; as these oils are the only substances contained in common vegetables, which prove totally volatile in that degree of heat; and as it is in them that the virtues of aromatics, and the peculiar odour and flavour of all plants, reside;—it is evident, that water may be impregnated by distillation, with the more valuable parts of many vegetables: that this impregnation is limited, the oil arising in this process pure from those parts of the plant which before rendered it soluble in water without limitation; hence the greatest part of the oil separates from the distilled aqueous liquor, and, according to its greater or less gravity, either sinks to the bottom or swims on the surface: that consequently infusions and distilled waters are very different from each other: that the first may be rendered stronger by pouring the liquor on fresh parcels of the subject; but that the latter cannot be in like manner improved by cohobating or redistilling them from fresh ingredients.

As the oils of many vegetables do not freely distil with a less heat than that in which water boils; as rectified spirit of wine is not susceptible of this degree of heat; and as this menstruum totally dissolves these oils in their pure state; it follows, that spirit elevates far less from most vegetables than water; but that nevertheless the distilled spirit, by keeping all that it does elevate perfectly dissolved, may, in some cases, prove as strong of the subject as the distilled water. The more gentle the heat, and the slower the distillation goes on, the volatile parts are the more perfectly separated in their native state.

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Nature,
use, and
manner of
evapora-
tion.

It may be observed, that as the parts which are preserved in evaporation cannot arise in distillation, the liquor remaining after the distillation, properly depurated and inspissated, will yield the same extracts as those prepared from the tincture or decoction of the subject made on purpose for that use; the one of these operations collecting only the volatile parts, and the other the more fixed; so that where one subject contains medicinal parts of both kinds, they may thus be obtained distinct, without one being injured by the process which collects the other.

The subjects of the second kind of distillation are, the gross oils of vegetables and animals, the mineral acid spirits, and the metallic fluid quicksilver; which as they require a much stronger degree of heat to elevate them than the foregoing liquors can sustain, so they likewise condense without arising so far from the action of the fire. The distillation of these is performed in low glass vessels, called, from their neck being bent to one side, *retorts*: to the farther end of the neck a receiver is luted, which standing without the furnace, the vapours soon condense in it, without the use of a refrigeratory: nevertheless, to promote this effect, some are accustomed, especially in warm weather, to cool the receiver, by occasionally applying wet clothes to it, or keeping it partly immersed in a vessel of cold water.

The vapours of some substances are so sluggish, or strongly retained by a fixed matter, as scarce to arise even over the low neck of the retort. These are most commodiously distilled in straight-necked earthen vessels called *longnecks*, laid on their sides, so that the vapour passes off laterally with little or no ascent: a receiver is luted to the end of the neck without the furnace. In this manner, the acid spirit of vitriol is distilled. The matter which remains in the retort or longneck, after the distillation, is vulgarly called *caput mortuum*.

In these distillations, a quantity of elastic air is frequently generated; which, unless an exit be allowed, blows off or bursts the receiver. The danger of this may in good measure be prevented, by slowly raising the fire; but more effectually by leaving a small hole in the luting, to be occasionally opened or stopt with a wooden plug; or inserting at the juncture an upright pipe of such a height, that the steam of the distilling liquor may not be able to rise to the top; but it is still better done by fitting to the apparatus other vessels, by which their vapours may be condensed. For the process of distilling, and the apparatus made use of, see DISTILLATION; and CHEMISTRY, n° 574.

SECT. VIII. SUBLIMATION.

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Of the sublimation
of solids.

As all fluids are volatile by heat, and consequently capable of being separated, in most cases, from fixed matters, by the foregoing process; so various solid bodies are subjected to a similar treatment. Fluids are said to *distil*, and solids to *sublime*; though sometimes both are obtained in one and the same operation. If the subliming matter concretes into a mass, it is commonly called a *sublimate*; if into a powdery form, *flowers*.

The principal subjects of this operation are, volatile alkaline salts; neutral salts, composed of volatile alkalis and acids, as sal ammoniac; the salt of amber,

and flowers of benzoin; mercurial preparations; and sulphur. Bodies of themselves not volatile, are frequently made to sublime by the mixture of volatile ones: thus iron is carried up by sal ammoniac in the preparation of the *flores martiales*, or *ferrum ammoniacale*.

The fumes of solid bodies in close vessels rise but little way, and adhere to that part of the vessel where they concrete. Hence a receiver or condenser is less necessary here than in the preceding operation; a single vessel, as a matraass, or tall phial, or the like, being frequently sufficient.

SECT. IX. EXPRESSION.

THE press is chiefly made use of for forcing out the juices of succulent herbs and fruits, and the insipid oils of the unctuous seeds and kernels. 85
On the expression of
juices, &c.

The harder fruits, as quinces, require to be previously well beat or ground; but herbs are to be only moderately bruised. The subject is then included in a hair bag, and pressed between wooden plates, in the common screw-press, as long as any juice runs from it.

The expression of oils is performed nearly in the same manner as that of juices: only here, iron-plates are substituted for the wooden ones there made use of. The subject is well pounded, and included in a strong canvas bag, between which and the plates of the press a haircloth is interposed.

The insipid oils of all the unctuous seeds are obtained, uninjured, by this operation, if performed without the use of heat; which, though it greatly promotes the extraction of the oil, at the same time impresses an ungrateful flavour, and increases its disposition to grow rancid.

The oils expressed from aromatic substances generally carry with them a portion of their essential oil; hence the smell and flavour of the expressed oils of nutmegs and mace. They are very rarely found impregnated with any of the other qualities of the subject: oil of mustard-seed, for instance, is as soft and void of acrimony as that of the almond, the pungency of the mustard remaining entire in the cake left after the expression.

SECT. X. EXSICCATION.

THERE are two general methods of exsiccating or drying moist bodies; in the one, their humid parts are exhaled by heat; in the other, they are imbibed or absorbed by substances whose soft and spongy texture adapts them to that use. Bodies intimately combined with, or dissolved in a fluid, as recent vegetables and their juices, require the first; such as are only superficially mixed, as when earthy or indissoluble powders are ground with water, are commodiously separated from it by the second. 86
Two methods of exsiccating or
drying moist bodies.

Vegetables and their parts are usually exsiccated by the natural warmth of the air: the assistance of a gentle artificial heat may, nevertheless, in general, be not only safely, but advantageously, had recourse to. By a moderate fire, even the more tender flowers may be dried, in a little time, without any considerable loss either of their odour or lively colour; which would both be greatly injured or destroyed by a more slow exsiccation in the air. Some plants, indeed, particularly

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larly those of the acrid kind, as horse-radish, scurvy-grass, and arum, lose their virtues by this process, however carefully performed; but far the greater number retain them unimpaired, and often improved.

The thicker vegetable juices may be exsiccated by the heat of the sun; or, where this is not sufficient, by that of a water-bath, or an oven moderately warm. The thinner juices may be gently boiled till they begin to thicken, and then treated as the foregoing. The process, termed *inspissation* or *evaporation*, has been spoken of already. The juices of some plants, as arum root, briony root, orris root, wild cucumbers, &c. separate, upon standing for some time, into a thick part, which falls to the bottom; and a thin aqueous one, which swims above it: this last is to be poured off, and the first exsiccated by a gentle warmth. Preparations of this kind have been usually called *fecula*; that of the cucumber, to be spoken of in its place, is the only one which practice now retains.

Indissoluble bodies, mixed with water into a thick consistence, may be easily freed from the greatest part of it, by dropping them on a *chalkstone*, or some powdered chalk pressed into a smooth mass, which readily imbibes their humidity. Where the quantity of fluid is large, as in the edulcoration of precipitates, it may be separated by decantation or filtration.

We before observed, that one of the principal circumstances favouring fermentation, was a certain degree of moisture. Exsiccation is therefore employed to dissipate humidity, and render vegetables thereby less liable to those changes produced by a kind of insensible fermentation.

SECT. XI. COMMINATION.

87
Comminu-
tion, or the
turning of
solid bodies
into small
particles or
powder.

COMMINATION is the bare reduction of solid coherent bodies into small particles or powder. The methods of effecting this are various, according to the texture of the subject.

Dry friable bodies, or such as are brittle and not very hard, and mixtures of these with somewhat moist ones, are easily pulverised in a mortar.

For very light dry substances, resins, and the roots of tenacious texture, the mortar may in some cases be previously rubbed with a little sweet oil, or a few drops of oil be occasionally added: this prevents the finer powder of the first from flying off, and the others from cohering under the pestle. Camphor is commodiously powdered by rubbing it with a little rectified spirit of wine.

Tough substances, as woods, the peels of oranges and lemons, &c. are most conveniently rasped; and soft oily bodies, as nutmegs, passed through a grater.

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The comminution of the harder minerals, as calamine, crystal, flint, &c. is greatly facilitated by extinction; that is, by heating them red-hot, and quenching them in water: by repeating this process a few times, most of the hard stones become easily pulverisable. This process, however, is not to be applied to any of the alkaline or calcareous stones; lest, instead of an insipid powder, we produce an acrimonious calx or lime.

Some metals, as tin, though strongly cohering in their natural state, prove extremely brittle when heated, inasmuch as to be easily divided into small particles by dexterous agitation. Hence the officinal method of pulverising tin, by melting it, and at the instant of its beginning to return into a state of solidity, briskly shaking it in a wooden box. The comminution of metals, in this manner, is termed by the metallurgists *granulation*.

On a similar principle, certain salts, as nitre, may be reduced into powder in large quantity, by dissolving them in boiling water, setting the solution over a moderate fire, and keeping the salt constantly stirring during its exsiccation, so as to prevent its particles, disjoined by the fluid, from reuniting together into larger masses.

Powders are reduced to a great degree of fineness by triturating, or rubbing them, for a length of time, in a mortar. Such as are not dissoluble in water, or injured by the admixture of that fluid, are moistened with it into the consistence of a paste, and levigated or ground in a flat smooth marble or iron plate; or where a large quantity is to be prepared at a time, in mills made for that use.

Comminution, though one of the most simple operations of pharmacy, has, in many cases, very considerable effect. The resinous purgatives, when finely triturated, are more easily soluble in the animal fluids, and consequently prove more cathartic, and less irritating, than in their grosser state. Crude antimony, which, when reduced to a tolerably fine powder, discovers little medicinal virtue, if levigated to a great degree of subtilty, proves a powerful medicine in many chronic disorders.

By comminution, the heaviest bodies may be made to float in the lightest fluids (c), for a longer or shorter time, according to their greater or less degree of tenuity. Hence we are furnished with an excellent criterion of the fineness of certain powders, and a method of separating the more subtile parts from the grosser, distinguished by the name of *elutrition* or *washing over*.

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SECT.

(c) Some attribute this effect to a diminution of the specific gravity of the body; and, at the same time, suppose the peculiar virtues of certain medicines, particularly mercury, to be in great measure owing to their gravity. If these hypotheses were just, it should follow, that the mercurial preparations, by being finely comminuted, would lose proportionably of their efficacy; and so indeed mercurius dulcis, for instance, has been supposed to do. But experience shows, that this is far from being the case; and that comminution by no means lessens but rather increases its power: when reduced to a great degree of subtilty, it passes readily into the habit, and operates, according to its quantity, as an alterative or a sialogogue; while in a grosser form, it is apt to irritate the stomach and bowels, and run off by the intestines, without being conveyed into the blood.

SECT. XII. FUSION.

88
Fusion the
reduction
of solid bo-
dies into a
fluid state
by fire.

FUSION is the reduction of solid bodies into a state of fluidity by fire. Almost all natural substances, the pure earths and the solid parts of animals and vegetables excepted, melt in proper degrees of fire; some in a very gentle heat, while others require its utmost violence.

Turpentine, and other soft resinous substances, liquefy in a gentle warmth: wax, pitch, sulphur, and the mineral bitumens, require a heat too great for the hand to support: fixed alkaline salt, common salt, nitre; require a red or almost white heat to melt them; and glass, a full white heat.

Among metallic substances, tin, bismuth, and lead, flow long before ignition: antimony likewise melts before it is visibly red-hot, but not before the vessel is considerably so: the regulus of antimony demands a much stronger fire. Zinc begins to melt in a red heat; gold and silver require a low white heat; copper a bright white heat; and iron an extreme white heat.

One body, rendered fluid by heat, becomes sometimes a menstruum for another, not fusible of itself in the same degree of fire. Thus red-hot silver melts on being thrown into melted lead less hot than itself: and thus if steel, heated to whiteness, be taken out of the furnace, and applied to a roll of sulphur, the sulphur instantly liquefying, occasions the steel to melt with it; hence the *chalybs cum sulphure* of the shops. This concrete, nevertheless, remarkably impedes the fusion of some other metals, as lead; which when united with a certain quantity of sulphur, is scarce to be perfectly melted by a very strong fire. Hence the method, described in its place, of purifying zinc; a metal upon which sulphur has no effect from the lead so frequently mixed with it.

Sulphur is the only unmetallic substance which mingles in fusion with metals. Earthy, saline, and other like matters, even the calces and glasses prepared from metals themselves, float distinct upon the surface, and form what is called *scoria* or dross. Where the quantity of this is large in proportion to the metal, it is most commodiously separated by pouring the whole into a conical mould: the pure metal or *regulus*, though small in quantity, occupies a considerable height in the lower narrow part of the cone; and when congealed, may be easily freed from the *scoria* by a hammer. The mould should be previously greased, or rather smoked, to make the metal come freely out; and thoroughly dried and heated, to prevent the explosion which sometimes happens from the sudden contact of melted metals with moist bodies.

SECT. XIII. CALCINATION.

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Calcination
reduces bo-
dies by
means of
fire from a
coherent to
a powdery
state, and
changes
their qua-
lity.

By calcination is understood the reduction of solid bodies, by the means of fire, from a coherent to a powdery state, accompanied with a change of their quality; in which last respect this process differs from comminution.

To this head belong the burning of vegetable and animal matters, otherwise called *ustion*, *incineration*, or *concremation*; and the change of metals into a powder, which in the fire either does not melt or vitrifies, that is, runs into glass.

The metals which melt before ignition, are calcined by keeping them in fusion for some time. The free admission of air is essentially necessary to the success of this operation; and hence, when the surface of the metal appears covered with calx, this must be taken off or raked to one side, otherwise the remainder excluded from the air will not undergo the change intended. If any coal, or other inflammable matter which does not contain a mineral acid, be suffered to fall into the vessel, the effect expected from this operation will not be produced, and part of what is already calcined will be revived or reduced; that is, it will return into its metallic form again.

Those metals which require a strong fire for fusion, calcine with a much less heat than is sufficient to make them flow. Hence the burning or scorification of such iron or copper vessels as are long exposed to a considerable fire without defence from the air. Gold and silver are not calcinable by any degree of fire.

In calcination, the metals visibly emit fumes: nevertheless the weight of the calx proves greater than that of the metal employed. The antimonial regulus gains about one eleventh part of its weight; zinc sometimes one-tenth; tin above one-sixth; and lead in its conversion into minium often one-fourth.

The calcination of metallic bodies, gold, silver, and mercury excepted, is greatly promoted by nitre. This salt exposed to the fire in conjunction with any inflammable substances, extricates their inflammable matter, and bursts with it into flame, accompanied with a hissing noise. This process is usually termed *desflagration* or *detonation*.

All the metallic calces and *scoriae* are revived into their metallic state by fusion with any vegetable or animal inflammable matter. They are all more difficult of fusion than the respective metals themselves; and scarcely any of them, those of lead and bismuth excepted, can be made to melt at all, without some addition, in the strongest fire that can be produced in the common furnaces. The additions called *fluxes*, employed for promoting the fusion, consist chiefly of fixed alkaline salts. A mixture of alkaline salt with inflammable matter, as powdered charcoal, is called a *reducing flux*, as contributing at the same time to bring the calx into fusion, and to revive it into metal. Such a mixture is commonly prepared from one part of nitre and two parts of tartar, by grinding them well together, setting the powders on fire with a bit of coal or a red-hot iron, then covering the vessel, and suffering them to desflagrate or burn till they are changed into a black alkaline coaly mass. This is the common reducing flux of the chemists, and is called from its colour the *black flux*. Metallic calces of *scoriae*, mingled with twice their weight of this compound, and exposed to a proper fire in a close covered crucible, melt and resume their metallic form; but though they received an increase of weight in the calcination, the revived metal is always found to weigh considerably less than the quantity from which the calx was made.

For a more particular account of all these processes, and an explanation of the principles on which they depend, see CHEMISTRY *passim*, and the articles themselves as they occur in the order of the alphabet.

PART II. PREPARATIONS AND COMPOSITIONS.

Containing those of the LONDON and EDINBURGH PHARMACOPOEIAS.

CHAP. I. *The more Simple Preparations.**The preparation of some substances not soluble in water. L.*

90 POUND these substances first in a mortar; then, pouring on a little water, levigate them on a hard and polished, but not calcareous, stone, that they may be made as fine as possible. Dry this powder on blotting-paper laid on chalk, and set it in a warm, or at least a dry, place, for some days.

In this manner are to be prepared,

Amber,

Antimony,

Calamine,

Chalk,

Coral,

Oyster-shells, first cleansed from their impurities,

Tutty.

Crabs claws, first broken into small pieces, must be washed with boiling water before they be levigated.

Verdegriſe must be prepared in the same manner.

Where large quantities of the foregoing powders are to be prepared, it is customary, instead of the stone and mallet, to employ hand-mills made for this purpose, consisting of two stones; the uppermost of which turns horizontally on the lower, and has an aperture in the middle, for supplying fresh matter, or of returning that which has already passed, till it be reduced to a proper degree of fineness.

For the levigation of hard bodies, particular care should be taken, whatever kind of instruments be used, that they may be of sufficient hardness, otherwise they will be abraded by the powders. The hematites, a hard iron ore, is most conveniently levigated between two iron planes; for if the common levigating stones be used, the preparation, when finished, will contain almost as much foreign matter from the instrument as the hematites.

It has been customary to moisten several powders in levigation, with rose, balm, and other distilled waters: these, nevertheless, have no advantage above common water, since in the subsequent exsiccation they must necessarily exhale, leaving the medicine possessed of no other virtue than what might be equally expected from it when prepared with the cheaper element.

Some few substances, indeed, are more advantageously levigated with spirit of wine than with water. Thus bezoar has the green colour usually expected in this costly preparation considerably improved thereby. A little spirit may be added to the other animal substances, if the weather be very hot, and large quantities of them are prepared at once, to prevent their running into putrefaction; an accident which in those circumstances sometimes happens when they are levigated with water only. Crabs-eyes, which abound with animal gelatinous matter, are particularly liable to this inconvenience.

The caution given above for reducing antimony calamine, and tutty, to the greatest subtilty possible, demands particular attention. The tenderness of the parts to which the two last are usually applied, requires them to be perfectly free from any admixture of gross irritating particles. The first, when not thoroughly comminuted, might not only, by its sharp needle-like spicula, wound the stomach, but likewise answers little valuable purpose as a medicine, proving either an useless load upon the viscera, or at best passing off without any other sensible effect than an increase of the grosser evacuations; while, if reduced to a great degree of fineness, it turns out a medicine of considerable efficacy.

The most successful method of obtaining these powders of the requisite tenuity, is, to wash off the finer parts by means of water, and continue levigating the remainder till the whole become fine enough to remain for some time suspended in the fluid; this process is received in the Edinburgh pharmacopœia, and there directed in the preparation of the following article.

Prepared antimony. E.

Let the antimony be first pounded in an iron mortar, and then levigated on a porphyry with a little water. After this, put it into a large vessel, and pour a quantity of water on it. Let the vessel be repeatedly shaken, that the finer part of the powder may be diffused through the water; the liquor is then to be poured off, and set by till the powder settles. The gross part, which the water would not take up, is to be further levigated, and treated in the same manner.

By this method, which is that commonly practised in the preparation of colours for the painter, powders may be obtained of any required degree of tenuity; and without the least mixture of the gross parts, which are always found to remain in them after long continued levigation; all the coarser matter settles at first, and the finer powder continues suspended in the water longer and longer, in proportion to the degree of its fineness. The same process may likewise be advantageously applied to other hard pulverisable bodies of the mineral kingdom, or artificial preparations of them; provided they be not soluble in, or specifically lighter than, water. The animal and absorbent powders, crabs-claws, crabs-eyes, oyster-shells, egg-shells, chalk, pearl, coral, and bezoar, are not well adapted to this treatment; nor indeed do they require it. These substances are readily soluble in acid juices without much comminution: if no acid be contained in the first passages, they are apt to concrete, with the mucous matter usually lodged there, into hard indissoluble masses; the greater degree of fineness they are reduced to, the more they are disposed to form such concretions, and become liable to obstruct the orifices of the small vessels.

Prepared calamine. E.

Calamine previously calcined for the use of those who make brass, is to be treated in the same manner as antimony.

Prepared chalk.

- 93 Chalk first triturated, and then frequently washed with water, till it imparts to it neither taste nor colour, is to be treated in the same manner as antimony.

As calamine is intended for external application, and often to parts very easily irritated, too much pains cannot be bestowed in reducing it to a fine powder; and the frequent washing of the chalk may have the effect of freeing it from some foreign matters: But with regard to this substance, the after part of the process, if not improper, is, in our opinion at least, unnecessary: and this observation may also be made with respect to the oculi, or more properly lapilli cancrorum, which the Edinburgh college direct to be treated in the same manner.

The preparation of hog's lard and mutton suet. L.

- 94 Cut them into pieces, and melt them over a slow fire; then separate them from the membranes by straining.

These articles had formerly a place also among the preparations of the Edinburgh college: But now they introduce them only into their list of the materia medica; as the apothecary will in general find it more for his interest to purchase them thus prepared, than to prepare them for himself: for the process requires to be very cautiously conducted, to prevent the fat from burning or turning black.

The purification of gum ammoniacum. L.

- 95 If gum ammoniac do not seem to be pure, boil it in water till it become soft; then squeeze it through a canvas bag, by means of a press. Let it remain at rest till the resinous part subside; then evaporate the water; and toward the end of the evaporation restore the resinous part, mixing it with the gummy.

In the same manner are purified assafoetida and such like gum resins.

You may also purify any gum which melts easily, such as Galbanum, by putting it in an ox-bladder, and holding it in boiling water till it be so soft that it can be separated from its impurities by pressing through a coarse linen cloth.

In straining all the gums, care should be taken that the heat be neither great nor long continued; otherwise a considerable portion of the more active volatile matter will be lost; an inconvenience which cannot by any care be wholly avoided. Hence the purer tears, unstrained, are in general to be preferred, for internal use, to the strained gums.

As an additional reason for this preference, we may add, that some of the gum-resins, purified in the common way, by solution in water, expression and evaporation, are not so easily soluble in aqueous menstrua after as before such depuration. On these accounts this process is entirely omitted by the Edinburgh college; and in every case where a gummy-resinous substance, before it be taken, is to be dissolved in water,

it may be as effectually freed from impurities at the time of solution as by this process. And when it is to be employed in a solid state, care should be taken that the purer parts alone be selected.

The burning of hartshorn. L.

Burn pieces of hartshorn till they become perfectly white; then reduce them to a very fine powder.

The pieces of horn generally employed in this operation are those left after distillation.

In the burning of hartshorn, a strong fire and the free admission of air are necessary. The potter's furnace was formerly directed for the sake of convenience; but any common furnace or stove will do. If some lighted charcoal be spread on the bottom of the grate, and above this the pieces of the horns are laid, they will be burnt to whiteness, still retaining their original form.

Burnt hartshorn is not now considered as a pure earth, having been found to be a compound of calcareous earth and phosphoric acid. It is the weakest of the animal absorbents, and is difficultly soluble in acids; but whether it be of equal or superior use in diarrhoeas to more powerful absorbents, must be left to observation.

The drying of herbs and flowers.

Let these, spread out lightly, be dried by a gentle heat. L.

Herbs and flowers must be dried by a gentle heat, from a stove or common fire. They must be taken in such quantities at a time, that the process will be speedily finished; for by this means their medical powers are best preserved. The most certain test of this is the perfect preservation of the natural colour: but the leaves of cicuta, and of other plants containing a volatile matter, must be immediately pounded, after being dried, and afterwards kept in a phial with a ground stopper. E.

The directions given by the London college are here less explicit, and perhaps less proper, than those of the Edinburgh college: for there can be no doubt of the propriety of drying these substances hastily, by the aid of artificial heat, rather than by the heat of the sun. In the application of artificial heat, the only caution requisite is to avoid burning; and of this a sufficient test is afforded by the preservation of colour. And the direction given with regard to cicuta may perhaps with advantage be followed with most of the other flowers and herbs, afterwards to be exhibited in powder.

The purifying of honey. L.

Melt the honey by the heat of a water bath, and remove the scum.

The intention of this process is to purify the honey from wax, or other drossy matters that have been united with it by the violence of the press in its separation from the comb, and from meal and such like substances, which are sometimes fraudulently mixed with it. When the honey is rendered liquid and thin by the heat, these lighter matters rise freely to the surface.

This preparation is not so necessary for honey that is to be used as an article of diet, as for that which is employed

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employed in the preparation of oxymels: hence the Edinburgh college, who have rejected all the oxymels, have omitted this process.

dicine, sometimes advantageously employed as an emetic, often as an expectorant, but still more frequently as a powerful diuretic.

The preparation of millipeds. L. E.

The burning of sponge.

- 99 The millipeds are to be inclosed in a thin canvas cloth, and suspended over hot proof-spirit in a close vessel, till they be killed by the steam, and rendered friable.

Beat the sponge, after cutting it in pieces; and, when separated from its gritty matter, burn it in a close iron vessel, until it becomes black and friable; afterwards rub it to a very fine powder. *L.*

This is a convenient way of rendering millipeds pulverisable, without endangering any loss of such virtues as they may possess.

The directions given by both colleges are precisely the same, and delivered in almost the same words.

The extraction of pulps. L. E.

- 100 Unripe pulpy fruits, and ripe ones if they be dry, are to be boiled in a small quantity of water until they become soft: then press out the pulp through a strong hair-sieve, and afterwards boil it down to the consistence of honey in an earthen vessel, over a gentle fire; taking care to keep the matter continually stirring, to prevent its burning.

The pulp of cassia fistularis is in like manner to be boiled out from the bruised pod, and reduced afterwards to a proper consistence, by evaporating the water.

The pulps of fruits that are both ripe and fresh, are to be pressed out through the sieve, without any previous boiling.

In the extraction of pulps, the direction of both colleges so nearly agree, that it is unnecessary to give a separate translation of each. We may only observe, that the London college, instead of softening the fruits by boiling them in a small quantity of water, directs them to be put in a moist place. This direction, though proper in some cases, is not generally the most suitable.

The drying of squills. L. E.

- 101 Let the squill, cleared from its outer skin, be cut transversely into thin slices, and dried with a very gentle heat. When properly managed, the squill is friable, and retains its bitterness and acrimony.

By this method the squill dries much sooner than when its several coats are only separated, as has been usually directed; the internal part is here laid bare, but, in each of the entire coats, it is covered with a thin skin, which impedes the exhalation of the moisture. The root loses in this process four fifths of its original weight; the parts which exhale appear to be merely watery: six grains of the dry root being equivalent to half a dram of the fresh; a circumstance to be particularly regarded in the exhibition of this medicine. In the preceding editions of our pharmacopœias, a particular caution was given, not to use an iron knife for cutting squills, but one of wood, ivory, or bone: the reason of this caution is said to be, not so much that the squill would receive any ill qualities from the iron; as, that its acrid juice, adhering to the knife, might render a wound received by it extremely painful, or even dangerous: but as no danger is to be apprehended from such an accident, the direction appears unnecessary. Dried squills furnish us with a me-

Put the sponge, cut into small pieces, and well freed from adhering earthy matters, into a close earthen vessel. Place it on the fire, and let it be stirred frequently till it become black and friable; then reduce it to a powder in a glass or marble mortar. *E.*

This medicine has been in use for a considerable time, and employed against scrofulous disorders and cutaneous foulnesses, in doses of a scruple and upwards. Its virtues seem to depend on a volatile salt just formed, and combined with its own oil. If the sponge be distilled with a strong heat, it yields a large proportion of that salt in its proper form. The salt is in this preparation so far extricated, that if the burnt sponge be ground in a brass mortar, it corrodes the metal so as to contract a disagreeable taint, and sometimes an emetic quality.

Bees, earthworms, and other animal substances, have by some been prepared in the same manner, and recommended in different diseases: but as these substances fall much short of sponge in the quantity of volatile salt producible from them by fire, they are probably inferior also in medicinal efficacy. Of all the animal matters that have been tried, raw silk is the only one which exceeds or equals sponge, in the produce of salt.

A good deal of address is requisite for managing this process in perfection. The sponge should be cut small, and beaten for some time in a mortar, that all the stony matters may be got out, which compared with the weight of the sponge when prepared, will sometimes amount to a considerable quantity. The burning should be discontinued as soon as the matter is become thoroughly black. If the quantity put into the vessel at once be large, the outside will be sufficiently burnt before the inside be affected; and the volatile salt of the former will in part escape, before that in the latter is begun to be formed. The best method of avoiding this inconvenience seems to be, to keep the sponge continually stirring, in such a machine as is used for the roasting of coffee.

And from this circumstance the iron vessel directed by the London college is preferable to the earthen one directed by that of Edinburgh. But the pounding in a glass or marble mortar, directed by the latter, is a necessary caution which the former college have omitted.

The purification of storax. L.

Dissolve the storax in rectified spirit of wine, and strain the solution: afterwards reduce it to a proper thickness with a gentle heat.

Storax was formerly directed to be purified by means of water; hence it was styled *syracis collatio*: but the method now adopted is much preferable, for the active parts

parts of the storax totally dissolve in spirit of wine, the impurities alone being left. And as these active parts do not rise in distillation, the spirit may be again recovered by distillation.

Purified filings of iron. E.

- 104 Apply a magnet to a sieve placed on filings of iron, so that the filings may be attracted upwards through the sieve.

Rust of iron, commonly called shavings of iron, prepared. E.

- 105 Set purified filings of iron in a moist place, that they may turn to rust, which is to be ground into an impalpable powder.

The cleansing of iron filings by means of a magnet is very tedious, and does not answer so well as might be expected; for if they are rusty, they will not be attracted by it, or not sufficiently: nor will they by this means be entirely freed from brass, copper, or other metallic substances which may adhere to them. It appears from the experiments of Henckel, that if iron be mixed by fusion with even its own weight of any of the other metals, regulus of antimony alone excepted, the compound will be vigorously attracted by the loadstone. The rust of iron is to be procured at a moderate rate from the dealers in iron, free from any impurities except such as may be washed off by water.

The rust of iron is by some preferred as a medicine to the calces or croci made by a strong fire. Hoffman relates, that he has frequently given it with remarkable success in obstinate chlorotic cases accompanied with excessive headaches and other violent symptoms; and that he usually joined with it pimpinella, arum root, and salt of tartar, with a little cinnamon and sugar. The dose is from four or five grains to twenty or thirty; some have gone as far as a dram; but all the preparations of this metal answer best in small doses, which should rather be often repeated than enlarged.

Scales of iron purified. E.

- 106 Let the scales of iron, which may be had at the anvils of the workmen, be purified by the magnet; for the magnet only attracts the smaller and purer parts, leaving the more thick and impure behind.

This is perhaps of all the forms the most eligible for obtaining the pure matter in such a divided state as to render it easily acted on by different menstrua; and the mode of purification here proposed is not only very effectual, but also very easily put into practice.

The extraction of mucilage. Gen.

- 107 Boil the gums or mucilaginous seeds in a sufficient quantity of water till it becomes viscid, nearly resembling the white of an egg; and then strain it by pressure through a linen cloth.

By this means vegetable mucilage may be easily obtained from many different substances in its pure state. And although this process is not directed in our pharmacopœias, yet we think that it might with advantage be adopted.

CHAP. II. *Of Conserve.*

CONSERVES are compositions of recent vegetable matters and sugar, beaten together into an uniform mass.

This management is introduced for preserving certain simples, undried, in an agreeable form, with as little alteration as possible in their native virtues; and to some subjects it is very advantageously applied. Vegetables, whose virtues are lost or destroyed by drying, may in this form be kept uninjured for a length of time: for, by carefully securing the mouth of the containing vessel, the alteration, as well as dissipation, of their active principles, is generally prevented; and the sugar preserves them from the corruption which juicy vegetables would otherwise undergo. There are, however, sundry vegetables whose virtues are impaired by this treatment. Mucilaginous substances by long lying with sugar, become less glutinous; and astringents become sensibly softer on the palate. Many of the fragrant flowers are of so tender and delicate a texture, as almost entirely to lose their peculiar qualities on being beaten or bruised.

In general, it is obvious, that in this form, on account of the large admixture of sugar, substances of considerable activity can alone be taken to advantage as medicines. And, indeed, conserves are at present considered chiefly as auxiliaries to medicines of greater efficacy, or as intermedia for joining them together. They are very convenient for reducing into boluses or pills the more ponderous powders, as mercurius dulcis, the calces of iron, and other mineral preparations; which, with liquid or less consistent matters, as syrups, will not cohere.

The shops were formerly encumbered with many conserves altogether insignificant; the few now retained have in general either an agreeable flavour to recommend them, or are capable of answering some useful purposes as medicines. Their common dose is the bulk of a nutmeg, or as much as can be taken up at once or twice upon the point of a knife. There is in general no great danger of exceeding in this particular.

Conserve of wood sorrel;

sea wormwood;

the red rose;

the outer rind of the Seville orange. L.

Pluck the leaves from the stalks, the unblown petals from the cups, taking off the heels. Take off the outer rind of the oranges by a grater; then beat each of them with a wooden pestle in a marble mortar, first by themselves, afterwards with three times their weight of double refined sugar, until they be mixed.

Conserve of the fresh leaves of mint;

red roses not blown;

the outer rind of Seville oranges rasped off by a grater. E.

These are directed to be prepared with triple their weight of sugar in the same manner as the conserves of the London college. The sugar should be pounded by itself, and passed through a sieve before it be mixed with the vegetable mass; for without this it cannot

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cannot be properly incorporated. Rose buds, and some other vegetables, are prepared for mixing with sugar by a small wooden mill contrived for that purpose.

In the same manner conserves may be prepared from many other vegetables. But besides the conserves for which general directions are given, there are others, for which, either on account of the particular mode of preparation, or of the proportion, our pharmacopœias have thought it necessary to give particular directions. But before taking notice of these, it is necessary to mention the medical properties of the conserves above enumerated.

Conserve of the leaves of wood-forrel. L.

- 109 This is a very elegant and grateful conserve; in taste it is lightly acidulous, with a peculiar flavour, which some compare to that of green-tea. It is taken occasionally for quenching thirst, and cooling the mouth and fauces, in distempers where the heat of the body is much increased.

Conserve of the tops of sea wormwood. L.

- 110 The conserve of wormwood has been celebrated in dropries: Matthioli relates, that several persons were cured by it of that distemper without the assistance of any other medicine. Where the disorder indeed proceeds from a simple laxity or flaccidity of the solids, the continued use of this medicine may be of some service; as it appears to be an elegant mild corroborant. It is directed to be given in the dose of half an ounce about three hours before meals.

Conserve of the buds of red roses. L. E.

- 111 This is a very agreeable and useful conserve. A dram or two dissolved in warm milk are frequently given as a light astringent, in weakness of the stomach, and likewise in coughs and phthical complaints. In the German ephemerides, examples are related of very dangerous phthyses cured by the continued use of this medicine: In one of these cases, twenty pounds of the conserve were taken in the space of a month; and in another, upwards of thirty. Riverius mentions several other instances of this kind. There is, however, much room for fallacy in such observations; as phthisis has not at all times been accurately distinguished from obstinate catarrhs, and some other affections; the antiseptic property of the sugar may perhaps have some share in the effect.

Conserve of the yellow rind of Seville orange-peel. L. E.

- 112 This conserve is a very elegant one, containing all the virtues of the peel in a form sufficiently agreeable, both with regard to the dose and the conveniency of taking. It is a pleasant warm stomachic; and with this intention is frequently used.

Conserve of the leaves of spearmint. E.

- 113 The conserve of mint retains the taste and virtues of the herb. It is given in weakness of the stomach and retchings to vomit: and frequently does service in some cases of this kind, where the warmer and more active preparations of mint would be less proper.

Conserve of arum.

- 114 Take of the fresh root of arum bruised, half a pound;

double refined sugar, a pound and a half. Beat them together in a mortar.

The root of arum, in its recent state, is a substance of great activity; but this activity is almost entirely lost on drying. Hence the compound powder which had formerly a place in our pharmacopœias is now rejected. And as neither water nor spirit extract its activity, this conserve is perhaps the best form in which it can be preserved in our shops. It may be given to adults in doses of a dram.

Conserve of hips. L.

Take of pulp of ripe hips one pound; double refined sugar, powdered, twenty ounces. Mix them into a conserve.

The conserve of hips is of some esteem as a soft cooling restringent; three or four drams or more are given at a time, in bilious fluxes, sharpness of urine, and hot indispositions of the stomach: A good deal of care is requisite on the part of the apothecary in making this conserve: the pulp is apt to carry with it some of the prickly fibres, with which the inside of the fruit is lined; if these be retained in the conserve, they will irritate the stomach, so as to occasion vomiting.

Conserve of sloes. L. E.

Put the sloes in water upon the fire that they may soften, taking care that they be not broken; then, the sloes being taken out of the water, press out the pulp, and mix it with three times its weight of double refined sugar into a conserve.

This preparation is a gentle astringent, and may be given as such in the dose of two or three drams. The degree of its astringency will vary according to the maturity of the sloes, and the length of time for which the conserve has been kept.

Conserve of squills.

Take of fresh squills, one ounce; double-refined sugar, five ounces. Beat them together in a mortar into a conserve.

This conserve is directed to be prepared in a small quantity, to guard against its varying in strength. It may be given to adults from half a dram to two scruples, especially when fresh.

But the conserve of squills is a more uncertain and less agreeable mode of exhibiting this article, than the powder of the dried root, particularly when made into pills, or given in the form of bolus with any other conserve.

Conserve of chervil. Suec.

Take of fresh leaves of chervil, double-refined sugar, each equal parts. Beat them together into a conserve.

Chervil has by some been extolled as an useful diuretic; and this is perhaps one of the most pleasant forms under which it can be exhibited.

Conserve of millipeds. Brun.

Take of live millipeds, one pound; double-refined sugar, two pounds and an half. Beat them together into a conserve.

If the millipeds possess those virtues which some have alleged, this is perhaps one of the best forms under

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der which they can be exhibited. And by children, to whom they are frequently prescribed, it may be easily taken, when other forms cannot be introduced.

Vitriolated conserve of roses. Brun.

- 120 To each pound of the conserve of roses add two drams of the diluted vitriolic acid.

This may be in some cases an useful means of increasing somewhat the astringency of the conserve of roses: But for the purposes for which the vitriolic acid is in general employed, the quantity that can thus be introduced is too inconsiderable to be of much service.

CHAP. III. Of Juices.

- 121 JUICES are obtained from the succulent parts of plants, by including them, after being properly cut, bruised, &c. in a hair bag, and pressing them, between wooden cheeks, in the common screw-press, as long as any liquor exudes.

The harder fruits require to be previously well beaten or ground; but herbs are to be only moderately bruised, for if these are over-bruised, a large quantity of the herbaceous matter will be forced out along with the juice. Hempen or woollen bags are apt to communicate a disagreeable flavour; the threads of these likewise swell in proportion as they imbibe moisture, so as in great measure to prevent the free percolation of the juice.

The fluids thus extracted from succulent fruits, both of the acid and sweet kind, from most of the acrid herbs, as scurvy-grass and water-crelles, from the acid herbs, as sorrel and wood-sorrel, from the aperient lactescent plants, as dandelion and hawkweed, and from sundry other vegetables, contain great part of the peculiar taste and virtues of the respective subjects. The juices, on the other hand, extracted from most of the aromatic herbs as those of mint and the fragrant Turkey balm, commonly called *balm of Gilead*, have scarcely any thing of the flavour of the plants, and seem to differ little from decoctions of them made in water boiled till the volatile odorous parts have been dissipated. Many of the odoriferous flowers, as the lily, violet, hyacinth, not only impart nothing of their fragrance to their juice, but have it totally destroyed by the previous bruising. From want of sufficient attention to these particulars, practitioners have been frequently deceived in the effects of preparations of this class: juice of mint has been often prescribed as a stomachic, tho' it wants those qualities by which mint itself and its other preparations operate.

The juices, thus forcibly pressed out from plants, differ from those which flow spontaneously, or from incisions; these last consisting chiefly of such fluids as are not diffused through the whole substance of the vegetable subject, but elaborated in distinct vessels, or secreted into particular receptacles. From poppy heads, slightly wounded, there issues a thick milky liquor, which dries by a moderate warmth into opium; whilst the juice obtained from them by pressure is of a dark-green colour, and far weaker virtue.

Juices newly expressed are generally thick, viscid, and very impure: By colature, a quantity of gross matter is separated, the juice becomes thinner, limpid, and better fitted for medicinal purposes, though as yet

not entirely pure: on standing, it becomes again turbid, and apt to run into a fermentative or putrefactive state. Clarification with whites of eggs renders the juices more perfectly fine; but there are few that will bear this treatment without a manifest injury to their flavour, taste, and virtue.

The most effectual method of purifying and preserving these liquors, is to let the strained juices stand in a cool place till they have deposited their grosser feces, and then gently pass them several times through a fine strainer till perfectly clear; when about a fortieth part of their weight of good spirit of wine may be added, and the whole suffered to stand as before: a fresh sediment will now be deposited, from which the liquor is to be poured off, strained again, and put into small bottles which have been washed with spirit and dried. A little oil is to be poured on the surface, so as very nearly to fill the bottles, and the mouths closed with leather, paper, or stopped with straw, as the flasks in which Florence wine is brought to us: this serves to keep out dust, and suffers the air, which in process of time arises from all vegetable liquors, to escape; which air would otherwise endanger the bursting of the bottles; or, being imbibed afresh, render their contents vapid and foul. The bottles are to be kept on the bottom of a good cellar or vault, placed up to the necks in sand. By this method some juices may be preserved for a year or two; and others for a much longer time.

It has already been observed, that there are great differences in juices, in regard to their being accompanied in the expression with the virtues of the subjects. There are equal differences in regard to their preserving those virtues, and this independently of the volatility of the active matter, or its disposition to exhale. Even the volatile virtue of scurvy-grass may by the above method be preserved almost entire in its juice for a considerable time: while the active parts of the juice of the wild cucumber quickly separate and settle to the bottom, leaving the fluid part inert. Juices of arum root, iris root, bryony root, and sundry other vegetables, throw off in like manner their medicinal parts to the bottom.

Compound juice of scurvy-grass.

Take of the juice of garden scurvy-grass two pints; brook lime and water-crelles, of each one pint; Seville oranges, twenty ounces by measure. Mix them, and, after the feces have subsided, pour off the liquor, or strain it. *L.*

Take of juice of garden scurvy-grass, water-crelles, both expressed from the fresh herbs, Seville oranges, of each two pounds; spirituous nutmeg-water, half a pound. Mix them and let them stand till the feces have subsided, then pour off the clear liquor. *E.*

By this formula the Edinburgh college have rejected the brook lime and the sugar of their former editions. The sugar was certainly a very improper addition; for though it may preserve dry vegetable matters, yet when added to juices largely impregnated with watery and mucilaginous matter, it would no doubt furnish that very principle most favourable to the production of the vinous fermentation. For the compound horse-radish water they have substituted the spirituous water of nutmegs: Besides that, this water has the same property

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of preserving the juices from fermentation; it is also much more agreeable to the palate, and will make the juices sit easier on the stomach.

The London college have retained nearly their former formula, giving it only a more proper name.

Both these compositions are of considerable use for the purposes expressed in the title: the orange juice is an excellent assistant to the scurvy-grass and other acrid antiscorbutics; which, when thus mixed, have been found from experience to produce much better effects than when employed by themselves. These juices may be taken from an ounce or two to a quarter of a pint, two or three times a-day: they generally increase the urinary secretion, and sometimes induce a laxative habit. Preserved with the cautions above-mentioned, they will keep good for a considerable time; though, whatever care be taken, they are found to answer better when fresh; and from the difficulty of preserving them so, they have of late been very much laid aside, especially since we have been provided with more convenient and useful remedies.

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When vegetable juices, or watery or spirituous decoctions or infusions, are exposed to a continued heat, the fluid gradually evaporating, carries off with it such volatile matters as it was impregnated with, and leaves the more fixed united together into one mass. The mass which remains from the evaporation of the expressed juice of a plant is called *inspissated juice*; from watery decoctions or infusions, an *extract*; from spirituous tinctures, a *resin*, or *essential extract*. The term *extract* is frequently used also as a general appellation of all the three kinds. Inspissated juices and watery decoctions, particularly the former, when evaporated no further than to the consistence of oil or honey, are called *robs*; and spirituous tinctures, reduced to a like consistence, are called *balsams*.

What relates to the expression of juices has already been delivered, with the most effectual means of preserving them in their liquid state, and a general account of what substances do or do not give out their virtues with their juices. In the inspissation of juices, there is further to be considered the volatility or fixity of their medicinal parts: if a plant loses its virtue, or part of its virtue, in being dried, it is obvious that the juice must lose as much in being inspissated to dryness, how gentle soever the heat be with which the inspissation is performed. It is likewise to be observed, that the medicinal parts of some juices are kept in a state of perfect solution by the watery fluid, so as to be completely retained by it after the liquor has been made fine by settling, straining, or other means; while the medicinal parts of others, not dissoluble by watery menstrua, are only diffused through the liquor in the same manner as the feculencies are, and separate along with these on standing.

Inspissated juice of the elder-berry. L.

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Take of expressed and depurated juice of elder-berries two pints; inspissate it in a water-bath, saturated with sea-salt.

Inspissated juice, commonly called rob of elder-berries. E.

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Take of juice of ripe elder-berries, five pounds; purest sugar, one pound. Evaporate with a gentle heat to the consistence of pretty thick honey.

This preparation, made with or without sugar, keeps well, and proves a medicine of considerable importance as an aperient, generally promoting the natural excretions by stool, urine, or sweat. The dose is from a dram or two to an ounce or more. A spoonful, diluted with water, is usually taken in common colds at bed-time.

Inspissated juice of wolfsbane. E.

Bruise the fresh leaves of aconitum; and including them in a hempen bag, strongly compress them in a press, so that they may give out their juice: let the juice be evaporated in open vessels in a water-bath, to the consistence of pretty thick honey: An empyreuma is to be avoided by constantly stirring the mixture towards the end of the process.

After the matter has become cold, let it be put up in glazed earthen vessels, and moistened with rectified spirit-of-wine.

In the same manner are prepared inspissated juices of belladonna or deadly nightshade, and hyoscyamus or henbane.

In these inspissated juices, the active parts of the plant are obtained in a concentrated state, and in a condition which admits of preparation for a considerable length of time. They furnish, therefore, a convenient form for exhibiting these articles which, in the practice of medicine, are perhaps more frequently used in the state of inspissated juice than any other. This is particularly the case with the hyoscyamus, which may often be advantageously employed when opium is indicated, but disagrees with the patient. But aconite and belladonna may in general, with greater advantage, be exhibited under the form of powder made from the dried leaves.

It is very remarkable that the London college have given no place to these articles. We cannot however help thinking, that their pharmacopœia would be enriched by introducing not only the articles themselves, but likewise these preparations, especially as they are not unfrequently prescribed by British practitioners.

Inspissated juice of hemlock. E.

Having expressed the juice of the leaves and stalks of hemlock when flowering, in the same manner as directed for that of the aconitum, evaporate it to the consistence of pretty thin honey; when it is cooled, add of the powder of the dried leaves of the plant as much as to make it into a mass fit for forming pills. Care, however, is to be taken, that the evaporation proceed only to such length, that as much of the powder can be mixed with the inspissated juice as shall make up about a fifth part of the whole mass.

A preparation similar to this was published at Vienna by Dr Stoerk, who recommends it as an efficacious resolvent in many obstinate disorders, where the common remedies avail nothing. He observes, that small doses should always be begun with, as two grains, made into a pill twice a-day; and that by gradually increasing

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increasing the dose, it may be given to two, three, or even four drams a-day, and continued in such quantities for several weeks: that it may be used in safety in infancy, old age, and pregnancy: that it neither accelerates nor disturbs the circulation; neither heats, nor cools, nor affects the animal functions: that it increases the secretions, and renders the mouth moist; seldom purges; very rarely vomits; sometimes augments perspiration; often produces a copious discharge of viscid urine; but in many patients does not increase any of the sensible evacuations: that it removes obstructions and their consequences; relieves rheumatic pains, though of long continuance; dissolves scirrhus tumors, both internal and external; and cures dropsies and consumptions proceeding from scirrhotities: that it often dissolves cataracts, or stops their progress, and has sometimes removed the gutta serena: that inveterate cutaneous eruptions, scald heads, malignant ulcers, cancers, the malignant fluor albus and gonorrhœa of long standing, obstinate remains of the venereal disease, and caries of the bones, generally yield to it: that for the most part it is necessary to continue this medicine for a considerable time before the cure be effected, or much benefit perceived from it: that in some cases it failed of giving any relief; that he met with some persons who could not bear its effects; and that consequently there must be some latent difference in the habit, the diagnostic signs of which are at present unknown: that though it is by no means infallible any more than other medicines, yet the great number of deplorable cases that have been happily cured by it, is sufficient to recommend it to further trials. The efficacy of this medicine is confirmed by many eminent practitioners abroad; though the trials hitherto made of it in this country have not been attended with much success. Somewhat, perhaps, may depend on the time of the plant's being gathered, and the manner of the preparation of the extract. Dr Stoerk himself takes notice of some mistakes committed in this respect: some have left the herb in a heap for several days, whence part of it withered, part rotted, and the juice became thick and mucilaginous; others have taken a very large quantity of the juice, and boiled it down in copper vessels with a great heat; by which means a strong fetor was diffused to a considerable distance, and the most efficacious parts dissipated: others, with officious care, have clarified the juice, and thus obtained a black tenacious extract, retaining but a small degree of the specific smell of the plant. The extract, duly prepared, according to the above prescription, is of a greenish brown colour, and a very disagreeable smell, like that of mice. But though there be reason to believe that much of the extract used here had been ill prepared, we can by no means admit that its general inefficacy was owing to this cause; for though there are not many instances of its discovering any valuable medicinal powers, there are several of its having activity enough, even in small doses, to produce alarming symptoms.

Modern practice, however, seems to hold a middle place; being neither influenced by the extravagant encomiums of Dr Stoerk, nor frightened by the wary suspicions of Dr Lewis. The inspissated juice of the hemlock is accordingly given with freedom in a great

variety of complaints, without our experiencing the wonderful effects ascribed to it by the former, or the baneful consequences dreaded by the latter. Like other preparations of this valuable herb, it is no doubt a very useful addition to our pharmacopœia; nor does its use seem to be more hazardous than that of opium and some other narcotics.

The London college direct the inspissated juice of cicuta to be prepared in the same manner as that of the elder-berry, and without the addition of any of the powder. This is the most pure extract; and the powder may easily be occasionally added. They direct the cicuta to be collected as soon as the flowers appear: And at that time the leaves are most fully impregnated with their active powers.

Inspissated juice of black currants. L.

Inspissated juice of lemons. L.

These two the London college also direct to be prepared in the same manner with the elder-berry juice. And under this form the agreeable and useful acid of these vegetables, in a concentrated state, may be preserved for a considerable length of time.

CHAP. IV. *Extracts and Resins.*

Observations on Extracts with Water.

These extracts are prepared by boiling the subject in water, and evaporating the strained decoction to a thick consistence.

This process affords us some of the more active parts of the plants, free from the useless indissoluble earthy matter, which makes the largest share of their bulk. There is a great difference in vegetable substances, with regard to their fitness for this operation; some yielding to it all its virtues, and others scarce any. Those parts in which the sweet, glutinous, emollient, cooling, bitter, austere, astringent virtues reside, are for the most part totally extracted by the boiling water, and remain almost entire on evaporating it: whilst those which contain the peculiar odour, flavour, and aromatic quality, are either not extracted at all, or exhale along with the menstruum. Thus gentian root, which is almost simply bitter, yields an extract possessing in a small volume the whole taste and virtues of the root.—Wormwood, which has a degree of warmth and strong flavour joined to the bitter, loses the two first in the evaporation, and gives an extract not greatly different from the foregoing: the aromatic quality of cinnamon is dissipated by this treatment, its astringency remaining; while an extract made from the flowers of lavender and rosemary discovers nothing either of the taste, smell, or virtues of the flowers.

General Rules for making Extracts with Water.

1. It is indifferent, with regard to the medicine, whether the subject be used fresh or dry; since nothing that can be preferred in this process will be lost by drying. With regard to the facility of extraction, there is a very considerable difference; vegetables in general giving out their virtues more readily when moderately dried than when fresh.

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2. Very compact dry substances should be reduced into exceeding small parts, previous to the affusion of the menstruum.

3. The quantity of water ought to be no greater than is necessary for extracting the virtues of the subject. A difference herein will sometimes occasion a variation in the quality of the product; the larger the quantity of liquor, the longer time will be requisite for evaporating it, and consequently the more volatile parts of the subject will be dissipated. A long-continued heat likewise makes a considerable alteration in the matter which is not volatile. Sweet substances, by long boiling with water, become nauseous; and the drastic purgatives lose their virulence, though without any remarkable separation of their parts.

4. The decoctions are to be depurated by colature; and afterwards suffered to stand for a day or two, when a considerable quantity of sediment is usually found at the bottom. If the liquor poured off clear be boiled down a little, and afterwards suffered to cool again, it will deposit a fresh sediment, from which it may be decanted before you proceed to finish the evaporation. The decoctions of very resinous substances do not require this treatment, and are rather injured by it; the resin subsiding along with the inactive dregs.

5. The evaporation is most conveniently performed in broad shallow vessels; the larger the surface of the liquor, the sooner will the aqueous parts exhale: This effect may likewise be promoted by agitation.

6. When the matter begins to grow thick, great care is necessary to prevent its burning. This accident, almost unavoidable if the quantity be large, and the fire applied as usual under the evaporating pan, may be effectually provided against, by carrying on the inspissation after the common manner, no farther than to the consistence of a syrup, when the matter is to be poured into shallow tin or earthen pans, and placed in an oven, with its door open, moderately heated; which acting uniformly on every part of the liquid, will soon reduce it to any degree of consistence required. This may likewise be more securely done, by setting the evaporating vessel in boiling water, but the evaporation is in this way very tedious.

Observations on Extracts with Rectified Spirit.

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Rectified spirit of wine dissolves the essential oils and resins of vegetables, and does not readily carry off the oil in its exhalation; the heat sufficient to exhale pure spirit being much less than that in which water evaporates to any considerable degree, or most essential oils distil. Hence a resinous or spirituous extract of wormwood, contrary to that made with water, contains the warmth and flavour, as well as bitterness, of the herb; one made from cinnamon possesses its aromatic virtue, as well as its astringency; and one from lavender and rosemary flowers, retains great part of their flavour and virtues; the volatile parts, which are carried off by water in its evaporation, being left behind by the spirit.

The spirit employed for this purpose should be perfectly free from any ill flavour, which would be communicated in part to the preparation; and from any admixture of phlegm or water, which would not only

vary its dissolving power, but likewise, evaporating towards the end of the inspissation, would promote the dissipation of the volatile parts of the subject. Hence, also, the subject itself ought always to be dry: those substances which lose their virtue by drying, lose it equally on being submitted to this treatment with the purest spirit.

The inspissation should be performed from the beginning, in the gentle heat of a water bath. It is not needful to suffer the spirit to evaporate in the air: greatest part of it may be recovered by collecting the vapour in common distilling vessels. If the distilled spirit be found to have brought over any flavour from the subject, it may be advantageously reserved for the same purposes again.

It is observable, that though rectified spirit be the proper menstruum of the pure volatile oils, and of the grosser resinous matter of vegetables, and water of the mucilaginous and saline; yet these principles are, in almost all plants, so intimately combined together, that whichever of these liquors is applied at first, it will take up a portion of what is directly soluble only in the other. Hence sundry vegetables, extremely resinous, and whose virtues consist chiefly in their resin, afford nevertheless very useful extracts with water, though not equal to those which may be obtained by a prudent application of spirit. Hence also the extracts made from most vegetables by pure spirit, are not mere resins; a part of the gummy matter, if the subject contained any such, is taken up along with the resin; an admixture of great advantage to it in a medicinal view. The spirituous extracts of several vegetable substances, as mint leaves, rhubarb, saffron, dissolve in water as well as in spirit.

Pure resins are prepared by mixing, with spirituous tincture of very resinous vegetables, a quantity of water. The resin, incapable of remaining dissolved in the watery liquor, separates and falls to the bottom; leaving in the menstruum such other principles of the plant as the spirit might have extracted at first along with it.

Observations on Extracts with Spirit and Water.

There are sundry vegetables, particularly those of a resinous nature, which are treated to better advantage with a mixture of water and spirit, than with either of them singly. The virtues of resinous woods, barks, and roots, may indeed be in great part extracted by long boiling in fresh portions of water; but at the same time they suffer a considerable injury from the continued heat necessary for the extraction, and for the subsequent evaporation of so large a quantity of the fluid. Rectified spirit of wine is not liable to this inconvenience; but the extracts obtained by it from the substances here intended, being almost purely resinous, are less adapted to general use than those in which the resin is divided by an admixture of the gummy matter, of which water is the direct menstruum.

There are two ways of obtaining these compound or gummy-resinous extracts: one, by using proof-spirit, that is, a mixture of about equal parts of spirit and water, for the menstruum; the other, by digesting the subject first in pure spirit and then in water, and afterwards uniting into one mass the parts which

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the two menstrea have separately extracted. In some cases, where a sufficiency of gummy matter is wanting in the subject, it may be artificially supplied, by inspissating the spirituous tincture to the consistence of a balsam, then thoroughly mixing with it a thick solution of any simple gum, as mucilage of gum-arabic, and drying the compound with a gentle heat. By this method are obtained elegant gummy-refins, extemporaneously miscible with water into milky liquors.

Observations on extracts by long digestion.

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It has been observed, that the virtues of vegetable decoctions are altered by long boiling. Decoctions or infusions of drastic vegetables, by long continued boiling or digestion, lose more and more of their virulence; and at the same time deposit more and more of a gross sediment, resulting probably from the decomposition of their active parts. On this foundation it has been attempted to obtain safe and mild preparations from sundry virulent drugs; and some of the chemists have strongly recommended the process, though without specifying, or giving any intimation of, the continuance of boiling requisite for producing the due mildness in different subjects. M. Beaumé, in his *Elemens de Pharmacie*, lately published, has given a particular account of an extract of opium prepared on this principle; of which extract, as it is alleged to be very useful in practice, it may not be improper to give a short description: And this we shall accordingly subjoin to our account of the opium purificatum of the London college.

Observations on particular extracts.

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Extract of chamomile,
broom tops,
gentian,
liquorice,
blackhellebore,
rue,
savin. L.

Boil the article in distilled water, press out the decoction, strain it, and set it apart that the feces may subside; then boil it again in a water-bath saturated with sea-salt to a consistence proper for making pills.

The same kind of bath is to be used in the preparation of all the extracts, that the evaporation may be properly performed.

Extract of gentian. E.

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Take of gentian root as much as you please. Having cut and bruised it, pour upon it four times its quantity of water. Boil to the consumption of one half of the liquor; and strongly expressing it, strain. Evaporate the decoction to the consistence of thick honey in vessels exposed to the vapour of hot water.

In preparing this and every other extract, it is necessary to keep up a constant stirring towards the end of the process, in order to prevent an empyreuma, and that the extract may be of an uniform consistence, and free of clots.

In the same manner are prepared,

Extract of the roots of black hellebore;
leaves of the pulsatilla nigricans;
leaves of rue;
leaves of white poppies;
imperfectly ripe seeds of hemlock.

All the above extracts contain the virtues of the vegetable in a state of tolerable perfection.

The extract of chamomile loses in its formation the specific flavour of the plant; but it is said to furnish a bitter remarkably antiseptic, and to be given with advantage in different stomach ailments to the extent of a scruple or two, either by itself, or in conjunction with other remedies. The extract of broom tops is chiefly employed in hydropic cases; and when taken to the quantity of about a dram, is said to operate as a powerful diuretic.

The mode of preparing these extracts directed by the London and Edinburgh colleges is not essentially different: but some advantage will arise from employing the distilled water directed by the former; and the directions given by the latter with regard to the quantity of water to be used, and the degree of boiling to be employed before expression, are not without some use.

The extract is the only preparation of the pulsatilla nigricans, and it seems sufficiently well suited to be brought into this form. The extract of the white poppy-heads is not perhaps superior in any respect to opium; but to those who may think otherwise, it is convenient to preserve them in this form for preparing the syrup occasionally. The seeds of hemlock have by some been thought stronger, or at least that they produce giddiness sooner, than the leaves; but this extract has not hitherto come into general use.

Compound extract of colocintida. L.

Take of pith of colocintida, cut small, six drams; socotorine aloes, powdered, an ounce and a half; scammony, powdered, half an ounce; smaller cardamon seeds, husked and powdered, one dram; proof spirit, one pint. Digest the colocintida in the spirit, with a gentle heat, during four days. To the expressed tincture add the aloes and scammony: when these are dissolved, distil off the spirit, so that what remains may be of a consistence proper for making pills, adding the seeds towards the end of the process.

This composition answers very effectually as a cathartic, so as to be relied on in cases where the patient's life depends on that effect taking place: the dose is from fifteen grains to half a dram. The proof spirit is a very proper menstruum for the purgative materials; dissolving nearly the whole substance of the aloes and scammony, except the impurities; and extracting from the colocynth, not only the irritating resin, but great part of the gummy matter. In the former pharmacopœias three spices were employed in this composition, cinnamon, mace, and cloves: the cardamon seeds, now introduced, are preferable, on account of their aromatic matter being of a less volatile nature; though a considerable part of the flavour, even of these, is dissipated during the evaporation of the phlegmatic part of the proof-spirit.

Elaterium. L.

Slit ripe wild cucumbers, and pass the juice, very lightly

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lightly pressed, through a fine hair sieve, into a glass vessel; then set it by for some hours until the thicker part has subsided. Pour off the thinner part swimming at the top, and separate the rest by filtering: cover the thicker part, which remains after filtration, with a linen cloth, and dry it with a gentle heat.

What happens in part in preparing the extract of hemlock, happens in this preparation completely, viz. the spontaneous separation of the medicinal matter of the juice on standing for a little time: and the case is the same with the juices of several other vegetables, as those of arum root, iris root, and bryony root. Preparations of this kind have been commonly called *fecula*. The filtration above directed, for draining off such part of the watery fluid as cannot be separated by decantation, is not the common filtration through paper, for this does not succeed here: the grosser parts of the juice, falling to the bottom, form a viscid cake upon the paper, which the liquid cannot pass through. The separation is to be attempted in another manner, so as to drain the fluid from the top: this is effected by placing one end of some moistened strips of woollen cloth, skains of cotton, or the like, in the juice, and laying the other end over the edge of the vessel, so as to hang down lower than the surface of the liquor: by this management the separation succeeds in perfection.

Elaterium is a very violent hydragogue cathartic. In general, previous to its operation, it excites considerable sickness at the stomach, and not unfrequently it produces severe vomiting. Hence it is seldom employed till other remedies have been tried in vain. But in some instances of ascites it will produce a complete evacuation of water where other cathartics have had no effect. Two or three grains are in general a sufficient dose. And perhaps the best mode of exhibiting it is by giving it only to the extent of half a grain at a time, and repeating that dose every hour till it begins to operate.

Extract of logwood. L.

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Take of shavings of logwood, one pound. Boil it four times, or oftener, in a gallon of distilled water, to one half; then, all the liquors being mixed and strained, boil them down to a proper consistence.

The extract of logwood has been used for a considerable time in some of our hospitals. It has an agreeable sweet taste, with some degree of astringency; and hence becomes serviceable in diarrhoeas, for moderately constringing the intestines and orifices of the smaller vessels: it may be given from a scruple to half a dram, and repeated five or six times a-day with advantage. During the use of this medicine, the stools are frequently tinged red by it, which has occasioned some to be alarmed as if the colour proceeded from blood: the practitioner therefore ought to caution the patient against any surprise of this kind.

The active parts of the logwood are difficultly extracted by means of water alone: hence the Edinburgh college call in the aid of spirit of wine, directing this extract to be prepared in the same manner as that of jalap, afterwards to be mentioned. And of the two modes, we are inclined to consider the latter as intitled to the preference.

Extract of Peruvian bark. L.

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Take of Peruvian bark, coarsely powdered, one pound; distilled water, 12 pints. Boil it for one or two hours, and pour off the liquor, which, while hot, will be red and pellucid; but, as it grows cold, will become yellow and turbid. The same quantity of water being again poured on, boil the bark as before, and repeat this boiling until the liquor, being cold, remains clear. Then reduce all these liquors, mixed together and strained, to a proper thickness, by evaporation.

This extract must be prepared under two forms; one *soft*, and fit for making pills; the other *hard*, that it may be reducible to a powder.

Extract of Peruvian bark with the resin. L.

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Take of Peruvian bark, reduced to coarse powder, one pound; rectified spirit of wine, four pints. Digest it for four days, and pour off the tincture; boil the residuum in 10 pints of distilled water to two; then strain the tincture and decoction separately, evaporating the water from the decoction, and distilling off the spirit from the tincture, until each begins to be thickened. Lastly, mix the resinous with the aqueous extract, and make the mass fit for forming into pills.

Extract of Peruvian bark. E.

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The Edinburgh college, who have not given a place to any pure watery extract of the bark, direct their extract of this medicine to be prepared in the same manner as their extract of jalap, that is, almost precisely in the same manner as the extract with resin of the London college. It is, however, we think with propriety, that the London college have given a place to both extracts; for neither is without its use.

Peruvian bark is a resinous drug; the resin melts out by the heat, but is not perfectly dissolved by the water: hence, in cooling, it separates, renders the liquor turbid, and in part falls to the bottom, as appears manifestly upon examining the sediment by spirit of wine. This extract might be made to better advantage by the assistance of spirit of wine, after the same manner as that of jalap; and this method the Edinburgh college have directed. But all the spirits which can be expected to be employed for this process among us, are accompanied with some degree of bad flavour: this adheres most strongly to the phlegmatic part of the spirit, which evaporating last, must communicate this ill flavour to the extract; a circumstance of very great consequence, as this medicine is designed for those whose stomachs are too weak to bear a due quantity of bark in substance. Ten or twelve grains of the hard extract are reckoned equivalent to about half a dram of the bark itself.

In the Peruvian bark, however, we may readily distinguish two different kinds of tastes, an astringent and a bitter one; the former seems to reside principally in the resinous matter, and the latter chiefly in the gummy. The watery extract is moderately strong in point of bitterness, but of the astringency it has only a small degree. The pure resin, on the other hand, is strong in astringency, and weak in bitterness. Both qualities

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are united in the extract with the resin; which appears to be the best preparation of this kind that can be obtained from this valuable drug.

Extract of cascarilla. L.

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This extract, which is now for the first time introduced into the pharmacopœia of the London college, and which has not yet obtained a place in that of Edinburgh, is directed to be prepared by spirit and water in the same manner as the extract of bark with the resin. It possesses, in a concentrated state, the active constituent parts of the cascarilla, and has accordingly been already received into several of the best foreign pharmacopœias. In some of these, as the Pharmacopœia Suecica, it is a mere watery extract: but in others, as the Pharmacopœia Rossica, the aid both of spirits and water are conjoined; and this we consider as the best preparation.

Extract of jalap. E.

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Take of jalap root one pound; rectified spirit of wine, four pounds. Digest four days, and pour out the tincture. Boil the remaining magma in ten pounds of water to two pounds; then strain the decoction, and evaporate it to the consistence of pretty thin honey. Draw off the spirit from the tincture by distillation till what remains becomes thick. Then mix the liquors thus inspissated; and keeping them constantly stirring, evaporate to a proper consistence.

The extract of jalap is directed to be prepared by the London college in the same manner as their extract of Peruvian bark with the resin, which differs in nothing from the mode of preparation above directed.

This extract is an useful purgative; by some thought preferable to the crude root, as being of more uniform strength, and as the dose, by the rejection of the woody parts, is rendered smaller: the mean dose is 12 grains. If the spirituous tincture were inspissated by itself, it would afford a resinous mass, which, unless thoroughly divided by proper admixtures, occasions violent griping, and yet does not prove sufficiently cathartic; the watery decoctions yield an extract which operates very weakly: both joined together, as in this preparation, compose an effectual and safe purge. This method of making extracts might be advantageously applied to several other resinous substances, as the dry woods, roots, barks, &c. A small quantity of spirit takes up the resin; and much less water than would otherwise be necessary, extracts all the other soluble parts.

In a former edition of the Edinburgh Pharmacopœia, a little fixed alkaline salt was ordered to be added to the water in which the jalap is boiled after the action of spirit; on a supposition that this would enable the water to extract more from the root than it could by itself. But, so far as the quantity of the alkaline salt could go, it had the opposite effect, impeding the action of the water. The resinous parts of the jalap are dissolved by the spirit; and little other than the gummy matter remains for water to extract. Now, if pure gum arabic be put into water along with any alkaline salt, the salt will render the water incapable of dissolving the gum: if the gum be dissolved

first, the addition of any alkaline salt will precipitate it.

Extract of senna. L.

Take of senna, one pound; distilled water, one gallon.

Boil the senna in the distilled water, adding after its decoction a little rectified spirit of wine. Evaporate the strained liquor to a proper thickness.

This extract had no place in our former pharmacopœias, but may be considered as an useful addition.

The resinous parts of senna are in so small a proportion to the gummy, that they are readily boiled out together. The spirit may be added when the decoction is reduced to one half or to three pints.

This extract is given as a gentle purgative from 10 grains to a scruple; or, in less quantity, as an assistant to the milder laxatives.

Purified opium. L.

Take of opium, cut into small pieces, one pound; proof spirit of wine, 12 pints. Digest the opium with a gentle heat, stirring now and then till it be dissolved, and filter through paper. Distil the tincture, so prepared, to a proper thickness.

Purified opium must be kept in two forms; one *soft*, proper for forming into pills; the other *hard*, which may be reduced into powder.

Opium was formerly purified by means of water; and in this state it had the name in our pharmacopœia of *extractum thebaicum*. But proof spirit has been found, by experiments, to be the best menstruum for opium, having dissolved three-fourths of dried opium, which was much more than was taken up either by rectified spirit or water. Hence we thus obtained most entirely the constituents of opium free from any adhering impurities: but it has been imagined that some particular advantages arise from the parts which are extracted by water, especially after long digestion; and accordingly the following extract of opium has been recommended by Mr Beaumé.

Extract of opium prepared by long digestion.

Let five pounds of good opium, cut in pieces, be boiled about half an hour, in 12 or 15 quarts of water: strain the decoction, and boil the remainder once or twice in fresh water, that so much of the opium as is dissoluble in water may be got out. Evaporate the strained decoctions to about six quarts; which being put into a tin cucurbit, placed in a sand-bath, keep up such a fire as may make the liquor nearly boil, for three months together if the fire is continued day and night, and for six months if it is intermitted in the night; filling up the vessel with water in proportion to the evaporation, and scraping the bottom with a wooden spatula from time to time, to get off the sediment which begins to precipitate after some days digestion. The sediment needs not to be taken out till the boiling is finished; at which time the liquor is to be strained when cold, and evaporated to an extract of a due consistence for being formed into pills.

The author observes, that by keeping the liquor strongly boiling, the tedious process may be considerably expedited, and the six months digestion reduced to

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to four months: that in the beginning of the digestion, a thick, viscous, oily matter rises to the top, and forms a tenacious skin as the liquor cools; this is supposed to be analogous to essential oils, though wanting their volatility: that the oil begins to disappear about the end of the first month, but still continues sensible till the end of the third, forming oily clouds as often as the liquid cools: that the resin at the same time settles to the bottom in cooling, preserving for a long while its resinous form, but by degrees becoming powdery, and incapable of being any longer softened, or made to cohere by the heat: that when the process is finished, part of it still continues a perfect resin, dissoluble in spirit of wine, and part an indissoluble powder: that when the digested liquor is evaporated to about a quart, and set in the cold till next day, it yields a brownish earthy saline matter, called the *essential salt of opium*, in figure nearly like the sedative salt obtained from borax, intermingled with small needled crystals. He gives an account of his having made this preparation six or seven times. The vessel he made use of was about two inches and a half diameter in the mouth: the quantity of water evaporated was about 24 ounces a-day, and from 130 to 140 quarts during the whole digestion. Out of 64 ounces of opium, 17 ounces remained undissolved in the water; the quantity of resinous matter precipitated during the digestion, was 12 ounces: from the liquor, evaporated to a quart, he obtained a dram of essential salt, and might, he says, have separated more; the liquor being then further evaporated to a pilular consistence, the weight of the extract was 31 ounces.

It is supposed that the narcotic virtue of opium resides in the oily and resinous parts; and that the gummy extract, prepared by the above process, is endowed with the calming, sedative, or anodyne powers of the opium, divested of the narcotic quality as it is of the smell, and no longer productive of the disorders which opium itself, and the other preparations of it, frequently occasion. A case is mentioned, from which the innocence and mildness of the medicine are apparent; 50 grains having been taken in a day, and found to agree well, where the common opiate preparations could not be borne. But what share it possesses of the proper virtues of opium is not so clear; for the cure of convulsive motions of the stomach and vomitings, which at length happened after the extract had been continued daily in the above doses for several years (*plusieurs années*), cannot perhaps be ascribed fairly to the medicine.

If the theory of the process, and of the alteration produced by it in the opium, be just, a preparation equivalent to the above may be obtained in a much shorter time. If the intention is to separate the resinous and oily parts of opium, they may be separated by means of pure spirit of wine, in as many hours as the digestion requires months. The separation will also be as complete, in regard to the remaining gum, tho' some part of the gum will in this method be lost, a little of it being taken up by the spirit along with the other principles.

In what particular part of opium its peculiar virtues reside, has not perhaps been incontestably ascertained; but this much seems clear from experiment, that the pure gum, freed from all that spirit can dissolve, does

not differ essentially in its soporific power from the resinous part.

There are grounds also to presume, that by whatever means we destroy or diminish what is called the *narcotic, soporific, virulent quality of opium*, we shall destroy or diminish likewise its salutary operation. For the ill effects which it produces in certain cases, seem to be no other than the necessary consequences of the same power, by which it proves so beneficial in others.

Extract of wormwood. Suec.

Take any quantity of the tops of wormwood, and pour upon it double its weight of water. Boil it for a short time over a gentle fire, then press out the liquor. Boil the residuum again in a fresh quantity of water, and after expression, strain it. Let the strained liquor be evaporated in a water-bath to a proper consistence.

In this extract we have one of the strongest vegetable bitters in its most concentrated state: and though it is not perhaps to be considered as superior to the extract of gentian, yet it furnishes a good variety, and is a more agreeable form for exhibiting the wormwood than that of strong tincture.

Extract of dandelion. Suec.

This is directed to be prepared from the roots of the dandelion, collected early in the spring, or late in the autumn, in the same manner as the extractum absinthii. And as far as the dandelion really possesses a resolvent, aperient, or diuretic power, it furnishes a convenient form for obtaining these effects from it. But as the dandelion is well known to abound with a milky juice, it is probable that the activity of the medicine would be increased from employing spirit also in the extraction of its medical virtues.

Watery extract of aloes. Suec.

Take of hepatic aloes one pound; cold spring-water, four pounds; juice of citrons, one pound. Macerate them in a glass vessel for one or two days, shaking the vessel from time to time. When the resinous and feculent parts have subsided, pour off the liquor; and to the residuum add fresh water, till by this treatment it obtains a little impregnation. Let the strained liquors be then evaporated in a warm bath to the consistence of honey.

Although aloes are perhaps upon the whole a better medicine, in their crude state, where the gummy and resinous matters are united, than in those preparations where either is retained separately, yet the gummy extract which is thus obtained is at least less disagreeable, having little smell or taste, while at the same time it is a very powerful purgative: hence it may be usefully employed at least on some occasions.

Gummy extract of myrrh. Brun.

Take of myrrh, half a pound; spring-water, four pounds. Let the myrrh be dissolved by gentle digestion and repeated agitation of the vessel for four or five days: let the water swimming above the myrrh be then poured off, strained, and evaporated to the consistence of an extract.

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This watery extract of myrrh may be useful in some cases, as being much deprived of the heating qualities which it has in its crude state: and if it furnishes us in phthisis pulmonalis with that useful remedy which some imagine, it may probably be most advantageously exhibited under this form.

Refined liquorice. Dan.

- 150 Take any quantity of Spanish liquorice, cut it into small fragments, dissolve it in tepid water, and strain the solution. Let the liquor be poured off from the feculent part after it has subsided, and inspissated by a gentle heat.

The extract of liquorice already mentioned, when it is prepared with due skill and attention, is unquestionably an article superior to this; but it is very rarely met with in the shops of our druggists or apothecaries as prepared by themselves. In its place they very commonly employ either the extract brought from Spain, or that prepared by the makers of liquorice at home; both of which very commonly abound with impurities. It has even been said, that a portion of sand is not unfrequently mixed with it to increase the weight: but whether the impurities arose from this cause, or from the slovenly mode of preparing it, considerable advantage must arise from freeing it from all these before it be employed for any purpose in medicine. And in modern practice it is frequently used, not only in troches and pills, but also for suspending powders in waters; such as the powder of Peruvian bark: and the powder of bark, when thus suspended, is in general taken more readily by children than in any other form. Hence considerable advantage must arise from a proper and easy mode of purifying it, which the above process affords. We are of opinion, therefore, that although a place be with propriety given to the extract of liquorice prepared by the apothecaries themselves, refined liquorice ought also to be introduced into our pharmacopœias; and it would be very convenient to keep it in the shops in a soft consistence fit for making pills, as it would not only answer that purpose, but admit of a ready solution in water when requisite. To this consistence, indeed, an objection occurs, from its being apt to grow mouldy; but this may be effectually prevented by the addition of a small proportion of spirit.

Besides the extracts which we have here selected from the foreign pharmacopœias, many others also still retain a place in several of these; such, for example, as the *extractum arnicæ, artemisæ, bryoniæ, cardui, centaurei, cochleariæ, croci*, &c. Several of these had formerly a place in our pharmacopœias, but are now with propriety rejected; because, where these substances are to be employed, they may with much more advantage be exhibited under other forms. And, indeed, although under the form of extract we have a condensation of some active principles, yet by the action of fire others are very apt to be lost. Hence, where any article can be conveniently exhibited in substance, that form is in general preferable; and recourse should be had to extracts only with a view to some particular intention. Our colleges therefore have with propriety diminished the number of them; and even those which they have adopted are but seldom to be had recourse to in preference to other forms. In the formation of many of

those extracts, retained by the foreign colleges, the most valuable principles are either entirely dissipated or destroyed by the fire. We think, however, that advantage may sometimes be obtained from adopting these which are here selected.

The chapter on extracts and resins in the London pharmacopœia is concluded with the two following general directions:

1. All the extracts, during the time of inspissation, must be gently agitated.
2. On all the softer watery extracts, a small quantity of spirit of wine must be sprinkled.

CHAP. V. *Expressed Oils.*

EXPRESSED oils are obtained chiefly from certain seeds and kernels of fruits, by thoroughly pounding them in a stone mortar, or, where the quantities are large, grinding them in mills, and then including them in a canvas bag, which is wrapt in a hair-cloth, and strongly pressed between iron plates. The canvas, if employed alone, would be squeezed so close to the plates of the press as to prevent the oil from running down: by the interposition of the hair-cloth a free passage is allowed it. 151

Sundry machines have been contrived, both for grinding the subject and pressing out the oil, in the way of business. To facilitate the expression, it is usual to warm either the plates of the press, or the subject itself after the grinding, by keeping it stirring in a proper vessel over the fire; the oil, liquefied by the heat, separates more freely and more plentifully. When the oil is designed for medicinal purposes, this practice is not to be allowed; for heat, especially if its degree be sufficient to be of any considerable advantage for promoting the separation, renders the oil less soft and palatable, impresses a disagreeable flavour, and increases its disposition to grow rancid: hence the colleges both of London and Edinburgh expressly require the operation to be performed without heat.

Nor are the oils to be kept in a warm place after their expression. Exposed for a few days to a heat no greater than that of the human body, they lose their emollient quality, and become highly rancid and acrimonious. Too much care cannot be taken for preventing any tendency to this acrid irritating state in medicines, so often used for abating immoderate irritation.

So much are these oils disposed to this injurious alteration, that they frequently contract an acrimony and rancidity while contained in the original subjects. Hence great care is requisite in the choice of the unctuous seeds and kernels, which are often met with very rancid; almonds are particularly liable to inconveniences of this kind.

Expressed oils are prepared for mechanic uses from sundry different subjects, as nuts, poppy-seed, hemp-seed, rape-seed, and others. Those directed for medicinal purposes in the London and Edinburgh pharmacopœias are the following:

Oil of almonds. L. E.

Pound fresh almonds, either sweet or bitter, in a mortar, then press out the oil in a cold press. 152

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In the same manner is to be expressed oil of linseed and oil of mustard-seed.

The oil of almonds is prepared from the sweet and bitter almonds indifferently, the oils obtained from both sorts being exactly the same. Nor are the differences of the other oils very considerable, the discriminating qualities of the subjects not residing in the oils that are thus obtained by expression. The oil of linseed requires indeed some peculiarities from containing a proportion of vegetable mucilage; but the oil of mustard-seed is as soft, insipid, and void of pungency, as that of sweet almonds, the pungency of the mustard remaining entire in the cake left after the expression. The several oils differ in some of their properties from each other; but in medicinal qualities they appear to be all nearly alike, and agree in one common emollient virtue. They soften and relax the solids, and obtund acrimonious humours; and thus become serviceable internally in pains, inflammations, heat of urine, hoarseness, tickling coughs, &c. in glysters, for lubricating the intestines, and promoting the ejection of indurated feces; and in external applications, for tension and rigidity of particular parts. Their common dose is half an ounce; in some cases they are given to the quantity of three or four ounces. The most commodious forms for their exhibition we shall see hereafter in the chapter of Emulsions.

Castor oil. L.

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This oil is directed by the London college to be prepared in the same manner as that of almonds, the seeds or nuts being taken from the husks before putting them into the mortar. Palma Christi, or castor oil, (See *OLEUM Palmae Christi*, and *RICINUS*), is a gentle and useful purgative: it generally produces its effects without griping, and may be given with safety where acrid purgatives are improper. With adults, from half an ounce to an ounce is generally requisite for a dose. This article, however, is very seldom prepared by our apothecaries, being in general imported under the form of oil from the West Indies: hence the Edinburgh college have not mentioned it among their preparations, but merely given it a place in their list of the materia medica. But when our apothecaries prepare it for themselves, they are more certain of obtaining a pure oil, and one too obtained without the aid of heat, which is often employed, and gives a much inferior oil. It is therefore with propriety that the London college have given directions for the preparation of it by the apothecary himself. But even the London college have not thought it necessary to give directions for the preparation of the following expressed oils, which, as well as the *oleum ricini*, are also introduced into the list of the materia medica by the Edinburgh college.

Expressed oil of bay berries,

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palm.

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These also are principally considered as possessing only an emollient virtue; but as far as they have been supposed to exert any peculiar qualities, these we have

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had occasion to mention in other parts of the work, when treating of the articles from which they are obtained. See *OLEA*, *MACE*, &c.

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Oil of chocolate nuts. Suec.

Express the oil from the nuts slightly toasted, and freed from their coverings.

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In this oil we have the nutritious part of chocolate, free from those aromatics with which it is united in the state in which it is kept in our shops. And although under the form of chocolate it fits perhaps more easily on the stomach than in most other forms; yet where, from any particular circumstance, aromatics are contraindicated, the oil in its pure state gives us an opportunity of employing in different ways this mild nutritious article.

Oil of hyoscyamus. Suec.

This oil is directed to be obtained by expression from the seeds of the hyoscyamus, in the same manner as that of almonds.

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Of the narcotic powers of the hyoscyamus some observations have already been offered. This oil, although an expressed one, is said to retain these virtues; and accordingly it has entered the composition of some anodyne ointments and plasters. We are, however, inclined to think, that when the sedative power of hyoscyamus is wanted under the form of oil, it may be best obtained from impregnating olive oil by the leaves of the plant.

Egg oil. Suec.

Take any quantity of fresh eggs, boil them till they be quite hard; then take out the yolks, break them in pieces, and roast them gently in a frying-pan till they feel greasy when pressed between the fingers; put them while warm into a hair-bag, and express the oil.

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The yolk of the egg is well known to be a mild nutritious substance: but notwithstanding the many virtues at one time attributed to it, of being pectoric and styptic, as externally applied; and of being useful in stomach complaints, dysentery, and different affections of the alimentary canal, when taken internally;—it is much to be doubted whether it be in any other way useful in medicine than as an article of diet; and we are very uncertain whether any particular purpose in medicine will be answered by this expressed oil: but as it holds a place in most of the foreign pharmacopœias of modern date, it may justly be considered as deserving some attention.

Notwithstanding the justice of the observation respecting the great similarity of expressed oils in general, yet there can be no doubt that in some instances they obtain a peculiar impregnation. This manifestly appears in the *oleum ricini*, *oleum nucis moschatae*, and some of the others mentioned above. Indeed oils expressed from aromatic substances in general retain some admixture of the essential oil of the subject from which they are expressed. Nor is this surprising, when we consider that in some cases the essential oil exists in a separate state even in the growing plant.

The rinds of the several varieties of oranges, lemons, and citrons, yield by a kind of expression their essential

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oils almost pure, and nearly similar to those which are obtained from them by distillation. The essential oils, in which the fragrance and aromatic warmth of these fruits reside, are contained in numerous little vesicles, which may be distinguished by the naked eye, spread all over the surface of the peel. If the rind be cut in slices, and the slices separately doubled or bent in different parts, and squeezed between the fingers, the vesicles burst at the bending, and discharge the oil in a number of fine slender jets. A glass plate being set upright in a glass or porcelain vessel, and the slices squeezed against the plates, the little jets unite into drops upon the plate, and trickle down into the vessel beneath. But though this process affords the true native oil in the same state wherein it existed in the subject, unaltered by fire or other agents, it is not practicable to advantage unless where the fruit is very plentiful, as only a small part of the oil it contains can thus be extracted or collected.

The oil is more perfectly separated by rubbing the rind upon a lump of sugar. The sugar, by the inequality of its surface, produces the effect of a rasp in tearing open the oily vesicles, and in proportion as the vesicles are opened the sugar imbibes the oil. When the outward part of the lump is sufficiently moistened, it is scraped off, and the operation continued on the fresh surface. The oil thus combined with the sugar is fit for most of the uses to which it is applied in a fluid state. Indeed the pure essential oils obtained by distillation are often purposely mixed with sugar to render their use the more commodious.

CHAP. VI. *Essential Oils.*

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ESSENTIAL oils are obtained only from odoriferous substances; but not equally from all of this class, nor in quantity proportional to their degree of odour. Some which, if we were to reason from analogy, should seem very well fitted for this process, yield extremely little oil, and others none at all. Roses and camomile flowers, whose strong and lasting smell promises abundance, are found upon experiment to contain but a small quantity; the violet and jessamine flower, which perfume the air with their odour, lose their smell upon the gentlest coction, and do not afford the least perceptible mark of oil on being distilled unless immense quantities are submitted to the operation at once; while favin, whose disagreeable scent extends to no great distance, gives out the largest proportion of oil of almost any vegetable known.

Nor are the same plants equally fit for this operation when produced in different soils or seasons, or at different times of their growth. Some yield more oil if gathered when the flowers begin to fall off than at any other time. Of this we have examples in lavender and rue; others, as sage, afford the largest quantity when young, before they have sent forth any flowers; and others, as thyme, when the flowers have just appeared. All fragrant herbs yield a larger proportion of oil when produced in dry soils and warm summers than in opposite circumstances. On the other hand, some of the disagreeable strong-scented ones, as wormwood, are said to contain most in rainy seasons and when growing in moist rich grounds.

Several of the chemists have been of opinion, that

herbs and flowers, moderately dried, yield a greater quantity of essential oil than if they were distilled when fresh. It is supposed; that the oil being already blended, in fresh plants, with a watery fluid, great part of it remains diffused through the water after the distillation, divided into particles too minute to unite and be collected; whereas in drying, the oily parts, on the exhalation of the moisture which kept them divided and dispersed, run together into globules, which have little disposition to mingle with watery fluids, and easily separate from the water employed in the distillation.

This theory, however, does not appear to be quite satisfactory; for though the oil be collected in the subject into distinct globules, it does not rise in that form, but is resolved into vapour, and blended and coagitated by the heat with the vapour of the water; and if the oil in a dry plant was less disposed to unite with aqueous fluids than in a fresh one, the dry ought to yield a weaker infusion than the fresh; the contrary of which is generally found to obtain. As the oil of the dry plant is most perfectly extracted and kept dissolved by the water before the distillation, it is difficult to conceive any reason why it should have a greater tendency to separate from the water afterwards.

The opinion of dry plants yielding most oil seems to have arisen from an observation of Hoffman, which has probably been misunderstood: "A pound (he says) of dry spike flowers yields an ounce of oil, but if they were distilled fresh they would scarcely yield above half an ounce; and the case is the same in balm, sage, &c. The reason is, that in drying the watery humidity exhales; and as from two pounds of a fresh plant we do not obtain above one pound of dry, and little of the subtle oil evaporates in the drying, it follows, that more oil ought to be afforded by the dry than by the fresh." The meaning of which seems to be no more than this, that if two pounds of a fresh plant are by drying reduced to one without any loss of the oil, then the one pound dry ought to be equivalent to the two fresh. A late writer quotes an experiment of Neumann, which appears to be misunderstood in the same manner; for Neumann, in the place referred to, says only that dry wormwood is found to yield much more oil than an *equal weight* of the fresh plant. Trials are yet wanting in which fresh and dry plants have been brought to a fair comparison, by dividing a quantity of the subject into two equal weights, and distilling one while fresh, and the other after it has been carefully and moderately dried.

But whatever may be the effect of moderate excication, it is certain, that if the drying be long continued, the produce of oil will be diminished, its colour altered, and its smell impaired.

With regard to the proportion of water to be employed, if whole plants moderately dried are used, or the shavings of woods, as much of either may be put into the vessel as, lightly pressed, will occupy half its cavity; and as much water may be added as will fill two-thirds of it. The water and ingredients altogether should never take up more than three-fourths of the still: there should be liquor enough to prevent any danger of an empyreuma, but not so much as to be too apt to boil over into the receiver.

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The maceration should be continued so long that the water may fully penetrate the parts of the subject. To promote this effect, woods should be thinly shaved across the grain or sawn, roots cut transversely into thin slices, barks reduced into coarse powder, and seeds slightly bruised. Very compact and tenacious substances require the maceration to be continued a week or two, or longer; for those of a softer and looser texture, two or three days are sufficient; while some tender herbs and flowers not only stand in no need of maceration, but are even injured by it.

Whether the addition of sea-salt, which some have recommended, be of any real service, is much to be doubted. The uses generally assigned to it are, to penetrate and unlock the texture of the subject more effectually than simple water could do, and to prevent the fermentation or putrefaction which the matter is apt to run into during the length of time for which the maceration is often continued. But sea-salt seems rather to harden and condense, than to soften and resolve, both vegetable and animal subjects; and if it prevents putrefaction, it must, on that very account, be injurious rather than of service. The resolution here aimed at approaches near to a beginning putrefaction; and saline substances, by retarding this, prolong the maceration far beyond the time that would otherwise be necessary. It is in the power of the operator, when he perceives the process coming near this pitch, to put a stop to it at pleasure, by proceeding immediately to distillation. By this means the whole affair will be finished in a very little time, with at least equal advantage in every other respect; provided the manual operations of pounding, rasping, and the like, which are equally necessary in either case, be minutely complied with.

Bodies of a very viscous and compact texture were directed, in the Edinburgh pharmacopœia, to be fermented for some days with a little yeast. Half their quantity of water is sufficient for performing the fermentation; as much more as is necessary is to be added afterwards before the distillation. This process undoubtedly promotes the resolution of the subject, and the extrication of the oil. It rarely happens, however, that assistances of this kind are needful. Particular care must be had not to continue the fermentation too long; or to give a bad flavour to the oil by an ill-chosen ferment, or using too large a quantity of any.

Some chemists pretend, that by the addition of salts and acid spirits they have been enabled to gain more oil from certain vegetable matters than could possibly be got from them without such assistance. Experiments made on purpose to settle this point seem to prove the contrary: this at least is constantly found to be true, that where there is any reason to think the produce greater than usual, the quality of the oil is proportionally injured. The quantity of true essential oil in vegetables can by no means be increased; and what is really contained in them may be easily separated without any addition of this kind. All that saline matters can do in this respect is to make the water susceptible of a greater degree of heat than it can sustain by itself, and thus enable it to carry up a gross unctuous matter not volatile enough to rise with pure water: this gross matter, mingling with the pure oil, increases the quantity, but at the same time

must necessarily debase its quality. And indeed, when water alone is used, the oil which comes over about the end of the operation is remarkably less fragrant, and of a thicker consistence, than that which rises at the beginning: distilled a second time, with a gentle heat, it leaves a large quantity of gross almost insipid resinous matter behind.

The choice of proper instruments is of great consequence for the performance of this process to advantage. There are some oils which pass freely over the swan-neck of the head of the common still; others, less volatile, cannot easily be made to rise so high. For obtaining these last, we would recommend a large low head, having a rim or hollow canal round it. In this canal the oil is detained on its first ascent, and thence conveyed at once into the receiver, the advantages of which are sufficiently obvious.

With regard to the fire, the operator ought to be expeditious in raising it at first, and to keep it up, during the whole process, of such a degree that the oil may freely distil; otherwise the oil will be exposed to an unnecessary heat; a circumstance which ought as much as possible to be avoided. Fire communicates to all these oils a disagreeable impregnation, as is evident from their being much less grateful when newly distilled, than after they have stood for some time in a cool place; the longer the heat is continued, the more alteration it must produce in them.

The greater number of oils require for their distillation the heat of water strongly boiling: but there are many also which rise with a heat considerably less; such as those of lemon and citron-peel, of the flowers of lavender and rosemary, and of almost all the more odoriferous kinds of flowers. We have already observed, that these flowers have their fragrance much injured, or even destroyed, by beating or bruising them; it is impaired also by the immersion in water in the present process, and the more so in proportion to the continuance of the immersion and the heat: hence oils, distilled in the common manner, prove much less agreeable in smell than the subjects themselves. For the distillation of substances of this class another method has been contrived; instead of being immersed in water, they are exposed only to its vapour. A proper quantity of water being put into the bottom of the still, the odoriferous herbs or flowers are laid lightly in a basket, of such a size that it may enter into the still, and rest against its sides, just above the water. The head being then fitted on, and the water made to boil, the steam, percolating through the subject, imbibes the oil, without impairing its fragrance, and carries it over to the receiver. Oils thus obtained possess the odour of the subject in an exquisite degree, and have nothing of the disagreeable scent perceivable in those distilled by boiling them in water in the common manner.

It may be proper to observe, that those oils which rise with a less heat than that of boiling water, are generally called, by the chemical and pharmaceutical writers, *light oils*; and those which require the heat of water strongly boiling, are called *ponderous*. We have avoided these expressions, as they might be thought to relate to the comparative *gravities* of the oils; with which the volatility or fixedness have no connection. Olive oil is lighter than most of the es-

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essential oils; but the heat requisite to make it distil, exceeds that in which the heaviest essential oil distils, considerably more than the heat of boiling water exceeds that of ice.

The water employed in the distillation of essential oils always imbibes some portion of the oil; as is evident from the smell, taste, and colour, which it acquires. It cannot, however, retain above a certain quantity; and therefore, such as has been already used and consequently saturated with oil, may be advantageously employed, instead of common water, in a second, third, or any future distillation of the same subject.

Some late chemical writers recommend, not the water which comes over, but that which remains in the still, to be used a second time. This can be of no service; as containing only such parts of the vegetable as are incapable of arising in distillation, and which serve only to impede the action of the water as a menstruum, and to endanger an empyreuma.

After the distillation of one oil, particular care should be taken to cleanse the worm before it be employed in the distillation of a different plant. Some oils, those of wormwood and aniseeds for instance, adhere to it so tenaciously, as not to be melted out by heat, or washed off by water: the best way of cleansing the worm from these, is to run a little spirit of wine through it.

Essential oils, after they are distilled, should be suffered to stand for some days, in vessels loosely covered with paper, till they have lost their disagreeable fiery odour, and become limpid: then put them up in small bottles, which are to be kept quite full, closely stopped, in a cool place: with these cautions, they will retain their virtues in perfection for many years.

When carelessly kept, they in time gradually lose their flavour, and become gross and thick. Some endeavour to recover them after they have undergone this change, by grinding them with about thrice their weight of common salt, then adding a large proportion of water, and distilling them afresh: the purer part rises thin and limpid, possessing a great degree of the pristine smell and taste of the oil, though inferior in both respects to the original oil. This rectification, as it is called, succeeds equally without the salt: the oils, when thus altered, are nearly in the same state with the turpentine, and other thickened oily juices, which readily yield their purer oil in distillation with water alone.

When essential oils have entirely lost their smell, some recommend adding them in the distillation of a fresh quantity of the oil of the same plant; by which means they are said to satiate themselves anew with the odorous matter, and become entirely renovated. This practice, however, ought doubtless to be disapproved, as being no other than a specious sophistication; for it can do no more than divide, between the old and the new, the active matter which belongs to the new alone.

Essential oils, medicinally considered, agree in the general qualities of pungency and heat; in particular virtues, they differ as much as the subject from which they are obtained, the oil being the direct principle

in which the virtues, or at least a considerable part of the virtues, of the several subjects reside. Thus the carminative virtue of the warm seeds, the diuretic of juniper-berries, the emmenagogue of savin, the nerve of rosemary, the stomachic of mint, the antiscorbutic of scurvy-grass, the cordial of aromatics, &c. are supposed to be concentrated in their oil.

There is another remarkable difference in essential oils, the foundation of which is less obvious, viz. the degree of their pungency and heat. These are by no means in proportion, as might be expected, to those of the subject they were drawn from. The oil of cinnamon, for instance, is very pungent and fiery; in its undiluted state it is almost caustic; whereas cloves, a spice which in substance is far more pungent than the other, yields an oil which is far less so. This difference seems to depend partly on the quantity of oil afforded, cinnamon yielding much less than cloves, and consequently having its active matter concentrated into a smaller volume; partly on a difference in the nature of the active parts themselves; for though essential oils contain always the specific odour and flavour of their subjects, whether grateful or ungrateful, they do not always contain the whole pungency; this resides frequently in a more fixed resinous matter, and does not rise with the oil. After the distillation of cloves, pepper, and some other spices, a part of their pungency is found to remain behind: a simple tincture of them in rectified spirit of wine is even more pungent than their pure essential oils.

The more grateful oils are frequently used for reconciling to the stomach medicines of themselves disgusting. It has been customary to employ them as correctors for the resinous purgatives; an use which they do not seem to be well adapted to. All the service they can here be of, is, to make the resin sit more easily at first on the stomach: far from abating the irritating quality on which the virulence of its operation depends, these pungent oils superadd a fresh stimulus.

Essential oils are never given alone, on account of their extreme heat and pungency; which in some is so great, that a single drop let fall upon the tongue produces a gangrenous eschar. They are readily imbibed by pure dry sugar, and in this form may be conveniently exhibited. Ground with eight or ten times their weight of sugar, they become soluble in aqueous liquors, and thus may be diluted to any assigned degree. Mucilages also render them miscible with water into an uniform milky liquor. They dissolve likewise in spirit of wine; the more fragrant in an equal weight, and almost all of them in less than four times their own quantity; these solutions may be either taken on sugar, or mixed with syrups, or the like: on mixing them with water, the liquor grows milky, and the oil separates.

The more pungent oils are employed externally against paralytic complaints, numbness, pains, and aches, cold tumors, and in other cases where particular parts require to be heated or stimulated. The tooth-ach is sometimes relieved by a drop of these almost caustic oils, received on cotton, and cautiously introduced into the hollow tooth.

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Essential oil of anise, L.

caraway,
lavender,
peppermint,
spearmint,
origanum,
pennyroyal,
rosemary,
juniper-berry,
sassafras root.

159 Let these oils be drawn off by distillation, from an alembic with a large refrigeratory; but, to prevent an empyreuma, water must be added to the ingredient; in which they must be macerated before distillation.

The water which comes over with the oil in distillation is to be kept for use.

Essential oils. E.

Of the herbs of garden mint,
Of peppermint,
Of fennel,
Of the tops of rosemary,
Of the flowering spikes of lavender,
Of aniseeds,
Of juniper-berries,
Of sassafras root,
Of Jamaica pepper.

160 These are prepared almost in the same manner as the simple distilled waters, excepting that for procuring the oil a somewhat less quantity of water is to be used. Seeds and woody matters are first to be bruised or rasped. The oil rises with the water; and as it is lighter or heavier, swims on the surface, or sinks to the bottom, from which it is afterwards to be separated.

It is, however, to be remarked, that, in preparing these distilled waters and oils, so many varieties must necessarily take place from the goodness of the subject itself, its texture, the time of the year, and such like circumstances, that a certain and general rule, which should strictly apply to each example, can scarcely be laid down; wherefore we have only explained the general method, leaving many things to be varied by the judgment of the operator.

To the directions for preparing these essential oils given by the London and Edinburgh colleges, we shall here next subjoin a few remarks on their medical properties.

Essential oil of aniseeds. L. E.

161 This oil possesses the taste and smell of the aniseeds in perfection. It is one of the mildest of the distilled oils; 15 or 20 drops may be taken at a time without danger, though common practice rarely goes so far as half this number. Its smell is extremely durable and diffusive; milk drawn from the breast after taking it, is found impregnated with its odour; and possibly this may be, in part, the foundation of the pectoral virtues usually ascribed to it; in flatulencies and colics, it is said by some to be less effectual than the seeds themselves.

It is remarkable of this oil, that it congeals, even when the air is not sensibly cold, into a butyraceous consistence; and hence, in the distillation of it, the

operator ought not to be over-sollicitous in keeping the water in the refrigeratory too cool: it behoves him rather to let it grow somewhat hot, particularly towards the end of the process; otherwise the oil congealing may so stop up the worm, as to endanger blowing off the head of the still, or at least a considerable quantity of oil will remain in it.

Essential oil of caraway seeds. L.

The flavour of this exactly resembles that of the caraway itself. It is a very hot and pungent oil; a single drop is a moderate dose, and five or six is a very large one. It is not unfrequently used as a carminative; and supposed by some to be peculiarly serviceable for promoting urine, to which it communicates some degree of its smell.

Essential oil of lavender flowers. L. E.

This oil, when in perfection, is very limpid, of a pleasant yellowish colour, extremely fragrant, possessing in an eminent degree the peculiar smell generally admired in the flowers. It is a medicine of great use, both externally and internally, in paralytic and lethargic complaints, rheumatic pains, and debilities of the nervous system. The dose is from one drop to five or six.

Lavender flowers yield the most fragrant oil, and considerably the largest quantity of it, when they are ready to fall off spontaneously, and the leaves begin to show themselves: the seeds give out extremely little. The flowers may be separated from the rest of the plant, by drying it a little, and then gently beating it: they should be immediately committed to distillation, and the process conducted with a well-regulated gentle heat; too great heat would not only change the colour of the oil, but likewise make a disagreeable alteration in its smell.

Essential oil of the leaves of peppermint. L. E.

This possesses the smell, taste, and virtues of the peppermint in perfection; the colour is a pale greenish-yellow. It is a medicine of great pungency and subtilty; and diffuses, almost as soon as taken, a glowing warmth through the whole system. In colics, accompanied with great coldness, and in some hysterical complaints, it is of excellent service. A drop or two are in general a sufficient dose.

Essential oil of the leaves of common mint. L. E.

This oil smells and tastes strongly of the mint, but is in both respects somewhat less agreeable than the herb itself. It is an useful stomachic medicine; and not unfrequently exhibited in want of appetite, weakness of stomach, retching to vomit, and other like disorders, when not accompanied with heat or inflammation: two or three drops, or more, are given for a dose. It is likewise employed externally for the same purposes; and is an useful ingredient in the stomachic plaster of the shops.

Essential oil of the leaves of origanum. L.

This oil has a very pungent acrimonious taste, and a penetrating smell. It has been chiefly employed externally as an errhine and for easing pains of the teeth.

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Essential oil of the leaves of pennyroyal. L.

This oil, in smell and taste, resembles the original plant; the virtues of which it likewise possesses. It is given in hysteric cases, from one to four or five drops.

Essential oil of rosemary. L. E.

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The oil of rosemary is drawn from the plant in flower. When in perfection, it is very light and thin, pale, and almost colourless; of great fragrantcy, though not quite so agreeable as the rosemary itself. It is recommended, in the dose of a few drops, in nervous and hysteric complaints. Boerhaave holds it in great esteem against epilepsies and suppressions of the uterine purgations occasioned by weakness and inactivity.

Essential oil of juniper-berries. L. E.

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This oil is a very warm and pungent one; of a strong flavour, not unlike that of the berries. In the dose of a drop or two, it proves a serviceable carminative and stomachic; in one of six, eight, or more, a stimulating, detergent, diuretic, and emmenagogue; it seems to have somewhat of the nature of the turpentine, or their distilled oil; like which it communicates a violent smell to the urine.

The oil of these berries resides partly in vesicles spread through the substance of the fruit, and partly in little cells contained in the seeds: when the berry is dry, and the oil hardened into a resinous substance, it becomes visible, on breaking the seeds, in form of little transparent drops. In order therefore to obtain this oil to advantage, we ought, previous to the distillation, to bruise the berry thoroughly, so as to break the seeds, and entirely lay open the oily receptacles.

Essential oil of saffras. L. E.

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This is the most ponderous of all the known essential oils, but rises in distillation with sufficient ease: it appears limpid as water, has a moderately pungent taste, a very fragrant smell, exactly resembling that of the saffras. It stands greatly commended as a sudorific, and for purifying the blood and juices: it is likewise supposed to be of service in humoral asthmas and coughs. The dose is from one drop to eight or ten; though Geoffroy goes as far as twenty.

The decoction remaining after the distillation of the oil, affords by inspissation an useful extract, of a mild, bitterish, subastringent taste. Hoffman says, he has given it with great benefit, in doses of a scruple, as a corroborant in cachectic cases, in the decline of intermitting fevers, and for abating hypochondriacal spasms.

Essential oil of savin leaves. L. E.

171

Savin is one of the plants which, in former editions of the Edinburgh pharmacopœia, were directed to be lightly fermented before the distillation: this, however, is not very necessary; for savin yields, without fermentation, and even without any such maceration, a very large quantity of oil. The oil of savin is a celebrated uterine and emmenagogue: in cold phlegmatic habits, it is undoubtedly a medicine of great service, though not capable of performing what it has been often represented to do. The dose is, two or three drops, or more.

*Essential oil of Jamaica pepper. E.*Prepara-
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This is a very elegant oil, and may be used as a succedaneum to those of some of the dearer spices. It is of a fine pale colour; in flavour more agreeable than the oil of cloves, and not far short of that of nutmegs. It sinks in water, like the oils of some of the eastern spices.

Oil of fossil tar. L.

Distil fossil tar, the *bitumen petroleum*, in a sand heat.

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The oil obtained from this tar will be more or less thin according to the continuance of the distillation; and by its continuance the tar will at last be reduced to a black coal; and then the oil will be pretty deep in colour, though perfectly fluid. This oil has a property similar to that of the tincture of nephritic wood in water, appearing blue when looked upon, but of an orange colour when held between the eye and the light. By long keeping it loses this property. It is less disagreeable than some of the other empyreumatic oils which had formerly a place in our pharmacopœia, such as the *oleum lateritium*, though very acrid and stimulating.

Oil of turpentine. L.

Take of common turpentine five pounds; water four pints. Distil the turpentine with the water from an alembic of copper. After the distillation of the oil, what remains is yellow resin.

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Rectified oil of turpentine. L.

Take of oil of turpentine one pound; water four pints. Distil.

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The process here proposed for rectifying this oil, is not only tedious but accompanied with danger. For unless the luting be very close, some of the vapour will be apt to get through; and if this catch fire, it will infallibly burst the vessels. This rectified oil, which in many pharmacopœias is styled æthereal, does not considerably differ in specific gravity, smell, taste, or medical qualities, from the former.

The spirit of turpentine, as this essential oil has been styled, is not unfrequently taken internally as a diuretic and sudorific. And in these ways it has sometimes a considerable effect when taken even to the extent of a few drops only. It has, however, been given in much larger doses, especially when mixed with honey. Recourse has principally been had to such doses in cases of chronic rheumatism, particularly in those modifications of it which are styled *sciatica* and *lumbago*. But they have not been often successful, and sometimes they have had the effect of inducing bloody urine.

Animal oil. L.

Take of oil of hartshorn one pound. Distil three times.

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Rectified oil of horns, or animal oil. E.

Take of empyreumatic oil, newly distilled from the horns of animals, as much as you will. Distil with a gentle heat, in a matrass furnished with a head, as long as a thin colourless oil comes over, which is to be freed of alkaline salt and spirit by means of water.

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water. That this oil may remain limpid and good, it ought to be put up in small phials, completely filled and inverted, having previously put into each phial a few drops of water, that on inverting it the water may interpose itself between the oil and the mouth of the phial.

The quantity of oil employed in this process should be considerable: for it leaves so much black matter behind in the several distillations, that it is reduced at last to a small portion of its original quantity. It is said, that the product is rendered more limpid, by mixing the oil with quicklime into a soft paste; the lime keeping down more of the gross matter than would remain without such an addition. The quicklime may here also perhaps act by abstracting fixed air; to the absorption of which we are disposed to refer in some measure the spoiling of the oil on exposure to the atmosphere.

The oil was first introduced by Dippelius, whose name it has since generally borne.

Animal oils thus rectified, are thin and limpid, of a subtle, penetrating, not disagreeable smell and taste. They are strongly recommended as anodynes and antispasmodics, in doses from 15 to 30 drops. Hoffman reports, that they procure a calm and sweet sleep, which continues often for 20 hours, without being followed by any languor or debility, but rather leaving the patient more alert and cheerful than before; that they procure likewise a gentle sweat, without increasing the heat of the blood: that given to 20 drops or more, on an empty stomach, six hours before the accession of an intermittent fever, they frequently remove the disorder; and that they are likewise a very generous remedy in inveterate and chronical epilepsies and in convulsive motions, especially if given before the usual time of the attack, and preceded by proper evacuations.

The empyreumatic oils of vegetables, rectified in the same manner by repeated distillations, suffer a like change with the animal; losing their dark colour and offensive smell, and becoming limpid, penetrating, and agreeable: in this state they are supposed, like the animal oil, to be anodyne, antispasmodic, and diaphoretic or sudorific. It is observable, that all the empyreumatic oils dissolve in spirit of wine, and that the oftener they are rectified or redistilled, they dissolve the more readily; a circumstance in which they differ remarkably from essential oils, which, by repeated distillations, become more and more difficult of solution.

How far these preparations really possess the virtues that have been ascribed to them, has not yet been sufficiently determined by experience; the tediousness and trouble of the rectification having prevented their coming into general use, or being often made. They are liable also to a more material inconvenience, in regard to their medicinal use, precariousness in their quality; for how perfectly soever they be rectified, they gradually lose in keeping the qualities they had received from that process, and return more and more towards their original fetid state.

Oil and salt of amber. E.

178 Take equal parts of amber reduced to a powder and of pure sand. Mix them, and put them into a

glass retort, of which the mixture may fill one half; then adapt a large receiver, and distil in a sand furnace, with a fire gradually increased. At first a spirit will come over, with some yellow oil; then more yellow oil, along with a little salt; and on raising the heat, more of the salt, with a reddish and black coloured oil. When the distillation is finished, empty the liquor out of the receiver; and having collected together the salt which adheres to the sides, dry it by gentle pressure between the folds of blotting paper; then purify it by solution in warm water and by crystallization.

Rectified oil of amber.

Distil the oil in a glass retort with six times its quantity of water till two-thirds of the water have passed into the receiver; then separate the rectified oil from the water, and keep it for use in close shut vessels. E.

Take of oil of amber one pound. Distil three times. L.

The London college introduce their directions for the preparation of the sal and oleum succini at an after part of their work, under the head of *sales*. Here we may only observe, that they direct it to be prepared from the amber alone, without the intervention of sand. But this makes no essential difference in the article when prepared.

The Edinburgh college have rejected what was formerly called the spirit, as being nothing else than the watery parts, fraught with the inert impurities of the bitumen and a very small portion of the salt. In the distillation of amber, the fire must for some time be continued gentle, scarce exceeding the degree at which water boils, till the aqueous phlegm and thin oil have arisen; after which it is to be slowly increased. If the fire were urged hastily, the amber would swell up, and rise in its whole substance into the receiver, without undergoing the required decomposition or separation of its parts. When sand or similar intermedia are mixed with it, it is less subject to this rarefaction, and the fire may be raised somewhat more expeditiously: though this little advantage is perhaps more than counterbalanced by the room which the sand takes up in the retort.

Our chemists generally leave the receiver unluted, that it may be occasionally removed as the salt rises and concretes in the neck of the retort; from whence it is every now and then scraped out to prevent the oil from carrying it down into the receiver. When a gross thick oil begins to arise, and no more salt appears, the distillation is stopt, though it might perhaps be continued longer to advantage.

Mr Pott informs us (in a curious dissertation on the salt of amber, published in the ninth volume of the Memoirs of the Academy of Sciences of Berlin), that the Prussian workmen, who prepare large quantities of this salt for exportation, from cuttings and small pieces of amber, perform the distillation without any intermedium, and in an open fire: that sweeping out the salt from the neck of the retort being found too troublesome, they suffer the oil to carry it down into the receiver, and afterwards separate it by means of bibulous paper, which imbibes the oil, and leaves the salt dry; which paper is afterwards squeezed and distilled: that they continue the distillation till all that can be forced

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forced over has arisen, taking care only to catch the last thick oil in a separate receiver; and that from this they extract a considerable quantity of salt, by shaking it in a strong vessel with three or four fresh portions of hot water, and evaporating and crystallizing the filtered waters.

The spirit of amber, so called, is no more than a solution of a small proportion of the salt in phlegm or water; and therefore is very properly employed for dissolving the salt in order to its crystallization.

The salt, freed from as much of the oil as spongy paper will imbibe, retains so much as to appear of a dark brown colour. Mr Pott says, the method he has found to succeed best, and with least loss, is, to dissolve the salt in hot water, and put into the paper, through which the solution is to be filtered, a little cotton slightly moistened with oil of amber: this, he says, detains a good deal of the oil of the salt, and the solution passes through the more pure. The liquor being evaporated with a very gentle fire, as that of a water-bath, and set to shoot, the first crystals prove transparent, with a slight yellowish tinge; but those which follow are brown, oily, and bitter, and are therefore to be further depurated in the same manner. The whole quantity of crystals amounts to about one-thirtieth of the weight of the crude amber employed. By sublimation from sea-salt, as directed in former editions of the Edinburgh pharmacopœia, the salt is thought to be more perfectly and more expeditiously purified: Mr Pott objects to sublimation, that a part of the salt is decomposed by it, a coaly matter being left behind, even though the salt was previously purified by crystallization: it may be presumed, however, that this coal proceeds rather from the burning of some remains of the oily matter, than from the decomposition of any part of the true salt.

Pure salt of amber has a penetrating, subastringent, acid, taste. It dissolves both in water and in rectified spirit; though not readily in either, and scarcely at all in the latter without the assistance of heat: of cold water in summer, it requires for its solution about twenty times its own weight; of boiling water only about twice its weight. Exposed in a glass vessel, to a heat little greater than that of boiling water, it first melts, then rises in a white fume, and concretes again in the upper part of the glass into fine white flakes, leaving, unless it was perfectly pure, a little coaly matter behind. It effervesces with alkalis both fixed and volatile, and forms with them neutral compounds much resembling those composed of the same alkalis and vegetable acids. Mixed with acid liquors, it makes no sensible commotion. Ground with fixed alkaline salts, it does not exhale any urinous odour. By these characters, it is conceived this salt may be readily distinguished from all the other matters that have been mixed with or vended for it. With regard to its virtue, it is accounted aperient, diuretic, and, on account of its retaining some portion of the oil, antihysterical: Boerhaave gives it the character of *diureticorum et antihystericalium princeps*. Its great price, however, has prevented its coming much into use; and perhaps its real virtues are not equal to the opinion generally entertained of them.

The rectified oil has a strong bituminous smell, and a pungent acrid taste. Given in a dose of ten or

twelve drops, it heats, stimulates, and promotes the fluid secretions: It is chiefly celebrated in hysterical disorders, and in deficiencies of the uterine purgations. Sometimes it is used externally, in liniments for weak or paralytic limbs and rheumatic pains. This oil differs from all those of the vegetable kingdom, and agrees with the mineral petrolea, in not being soluble either in its rectified or unrectified state, by spirit of wine, fixed alkaline lixivium, or volatile alkaline spirits; the oil, after long digestion or agitation, separating as freely as common oil does from water.

Oil of wine. L.

Take alcohol, vitriolic acid, of each one pint. Mix them by degrees, and distil; taking care that no black foam passes into the receiver. Separate the oily part of the distilled liquor from the volatile vitriolic acid. To the oily part add as much water of pure kali as is sufficient to take away the sulphureous smell: then distil the ether with a gentle heat. The oil of wine remains in the retort, swimming on the watery liquor, from which it is to be separated.

Some caution is requisite in mixing the two liquors, that the consequent heat and ebullition, which would not only dissipate a part of the mixture, but hazard the breaking of the vessel and the hurt of the operator, may be avoided. The securest way is to add the vitriolic acid to the spirit of wine by a little at a time, waiting till the first addition be incorporated before another quantity be put in. By this, the ensuing heat is inconsiderable, and the mixture is effected without inconvenience.

Essential oil of wormwood. Ross.

Let the fresh leaves of wormwood slightly dried be macerated with a sufficient quantity of water, and then subject to distillation; and let the oil which comes over be separated from the water which accompanies it.

This is one of the more ungrateful oils: it smells strongly of the wormwood, and contains its particular nauseous taste, but has little or nothing of its bitterness, this remaining entire in the decoction left after the distillation: its colour, when drawn from the fresh herb, is a dark green; from the dry, a brownish yellow. This oil is recommended by Hoffman as a mild anodyne in spasmodic contractions; for this purpose, he directs a dram of it to be dissolved in an ounce of rectified spirit of wine, and seven or eight drops of the mixture taken for a dose in any convenient vehicle. Boerhaave greatly commends, in tertian fevers, a medicated liquor composed of about seven grains of this oil ground first with a dram of sugar, then with two drams of the salt of wormwood, and afterwards dissolved in six ounces of the distilled water of the same plant: two hours before the fit is expected, the patient is to bathe his feet and legs in warm water, and then to drink two ounces of the liquor every quarter of an hour till the two hours are expired: by this means, he says, all cases of this kind are generally cured with ease and safety, provided there be no schirrhosity or suppuration. The oil of wormwood is employed chiefly as a vermifuge; and for this purpose is sometimes applied both externally to the belly, and

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taken internally; it is most conveniently exhibited in the form of pills, into which it may be reduced by mixing it with crumb of bread.

In the same manner with the oil of wormwood, the following oils, mentioned on the authority of the pharmacopœia Rossica, are also directed to be prepared.

Essential oil of orange-skins. Ross.

Essence of lemons.

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Of these essential oils, as existing in a separate state in the growing vegetable, we have already offered some observations. They are obtained in a very pure state by distillation. They are now rejected from our pharmacopœias, being employed rather as perfumes than as medicines. This is particularly the case with the essence of lemons, which is a pleasant oil, of a fine smell, very nearly as agreeable as that of the fresh peel; it is one of the lightest and most volatile essential oils we have, perfectly limpid, and almost colourless. It is taken in doses of two or three drops, as a cordial, in weakness of the stomach, &c. though more frequently used as a perfume. It gives a fine flavour to the officinal volatile aromatic spirit of the Edinburgh college, or the compound spirit of ammonia, as it is now styled by that of the London: and it may be remarked, that it enters the formula of both colleges, altho' neither of them has given it a place among their preparations, probably as it is one of those articles which the apothecary rarely prepares for himself. When soap is given in the form of pills, by the addition of a few drops of this oil they are thought to sit more easily on the stomach.

Essential oil of cloves. Ross.

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This oil is so ponderous as to sink in water, and is not easily elevated in distillation: if the water which comes over be returned on the remaining cloves, and the distillation repeated, some more oil will generally be obtained, though much inferior in quality to the first. The oil of cloves is usually described as being "in taste excessively hot and fiery, and of a gold yellow colour," (*Boerb. process.*). Such indeed is the composition which we receive under this name from Holland; but the genuine oil of cloves is one of the milder oils: it may be taken with great safety (duly diluted) to the quantity of 10 or 12 drops or more. Nor is its colour at all yellow, unless it has been long and carelessly kept, or distilled by too violent a fire: when in perfection, it is limpid and colourless, of a pleasant, moderately warm, and pungent taste, and a very agreeable smell, much resembling that of the spice itself. The Dutch oil of cloves contains a large quantity of expressed oil, as evidently appears upon examining it by distillation. This, however, cannot be the addition to which it owes its acrimony. A mean proportion of a resinous extract of cloves communicates to a large one of oil a deep colour, and a great degree of acrimony.

Essential oil of camomile. Ross.

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An oil of camomile had formerly a place in our pharmacopœias made by infusion of the recent plant, and its flowers in olive oil; and again separating it by

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pressure after impregnating it with the active parts of the plant by heat. This, however, was intended only for external application; but the essential oil is meant to be used internally.

It is a very pungent oil, of a strong not ungrateful smell, resembling that of the flowers: its colour is yellow, with a cast of greenish or brown. It is sometimes given in the dose of a few drops, as a carminative, in hysteric disorders, and likewise as a vermifuge: it may be conveniently made into pills with crumb of bread.

Oil of cinnamon. Ross.

This valuable oil is extremely hot and pungent, of a most agreeable flavour, like that of the cinnamon itself. In cold languid cases, and debilities of the nervous system, it is one of the most immediate cordials and restoratives. The dose is one, two, or three drops: which must always be carefully diluted by the mediation of sugar, &c.; for so great is the pungency of this oil, that a single drop let fall upon the tongue, undiluted, produces, as Boerhaave observes, a gangrenous eschar. In the distillation of this oil, a smart fire is required; and the low head, with a channel round it, recommended for the distillation of the less volatile oils, is particularly necessary for this, which is one of the least volatile, and which is afforded by the spice in exceeding small quantity. The distilled water retains no small portion of the oil; but this oil being very ponderous, great part of it subsides from the water, on standing for two or three weeks in a cool place.

Essential oil of fennel-seeds. Ross.

The oil obtained from sweet fennel-seeds is much more elegant and agreeable than that of the common fennel. It is one of the mildest of these preparations: it is nearly of the same degree of warmth with that of aniseeds; to which it is likewise similar in flavour, though far more grateful. It is given from two or three drops to ten or twelve, as a carminative, in cold indispositions of the stomach; and in some kinds of coughs for promoting expectoration.

Essential oil of rhodium. Ross.

This oil is extremely odoriferous, and principally employed as a perfume in scenting pomatums, and the like. Custom has not as yet received any preparation of this elegant aromatic wood into internal use among us.

Essential oil of mace. Ross.

The essential oil of mace is moderately pungent, very volatile, and of a strong aromatic smell, like that of the spice itself. It is thin and limpid, of a pale yellowish colour, with a portion of thicker and darker coloured oil at the bottom. This oil, taken internally to the extent of a few drops, is celebrated in vomiting, singultus, and colic pains; and in the same complaints it has also been advised to be applied externally to the umbilical region. It is, however, but rarely to be met with in the shops.

Essential oil of marjoram. Ross.

This oil is very hot and penetrating, in flavour not near so agreeable as the marjoram itself; when in perfection, it is of a pale yellow colour; by long keeping,

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it turns reddish: if distilled with too great a heat, it rises of this colour at first. It is supposed by some to be peculiarly serviceable in relaxations, obstructions, and mucous discharges of the uterus: the dose is one or two drops.

Essential oil of nutmegs. Ross.

- 190 The essential oil of nutmegs possesses the flavour and aromatic virtues of the spice in an eminent degree. It is similar in quality to the oil of mace, but somewhat less grateful.

Essential oil of rue. Ross.

- 191 The oil of rue has a very acrid taste, and a penetrating smell, resembling that of the herb, but rather more unpleasant. It is sometimes made use of in hysterical disorders and as an anthelmintic; and also in epilepsies proceeding from a relaxed state of the nerves.

Rue yields its oil very sparingly. The largest quantity is obtained from it when the flowers are ready to fall off, and the seeds begin to show themselves: suitable maceration, previous to the distillation, is here extremely necessary.

Essential oil of savory. Ross.

- 192 Savory yields on distillation a small quantity of essential oil, of great subtilty and volatility; and it is unquestionably an active article, but among us it is not employed in medicine.

Essential oil of tansey. Ross.

- 193 Tansey yields on distillation an oil of a greenish colour inclining to yellow. It smells strongly of the herb, and possesses at least its aromatic property in a concentrated state.

Oil of wax. Dan.

- 194 Melt yellow bees-wax with twice its quantity of sand, and distil in a retort placed in a sand-furnace. At first an acid liquor rises, and afterwards a thick oil, which sticks in the neck of the retort, unless it be heated by applying live coal. This may be rectified into a thin oil, by distilling it several times, without addition, in a sand-heat.

Boerhaave directs the wax, cut in pieces, to be put into the retort first, so as to fill one half of it; when as much sand may be poured thereon as will fill the remaining half. This is a neater, and much less troublesome way, than melting the wax, and mixing it with the sand before they are put into the retort. The author above-mentioned highly commends this oil against roughness and chaps of the skin, and other like purposes: the college of Strasburgh speak also of it being given internally, and say it is a powerful diuretic (*ingens diureticum*) in doses from two to four or more drops; but its disagreeable smell has prevented its coming into use among us.

The number of essential oils which have now a place in the London and Edinburgh pharmacopœias, and likewise in the foreign ones of modern date, is much less considerable than formerly; and perhaps those still retained afford a sufficient variety of the more active and useful oils. Most of the oils mentioned above, particularly those which have a place in the London and Edinburgh pharmacopœias, are prepared by our

chemists in Britain, and are easily procurable in a tolerable degree of perfection: but the oils from the more expensive spices, though still introduced among the preparations in the foreign pharmacopœias, are, when employed among us, usually imported from abroad.

These are frequently so much adulterated, that it is not an easy matter to meet with such as are fit for use. Nor are these adulterations easily discoverable. The grosser abuses, indeed, may be readily detected: thus, if the oil be mixed with spirit of wine, it will turn milky on the addition of water; if with expressed oils, rectified spirit will dissolve the essential, and leave the other behind; if with oil of turpentine, on dipping a piece of paper in the mixture, and drying it with a gentle heat, the turpentine will be betrayed by its smell. But the more subtle artists have contrived other methods of sophistication, which elude all trials of this kind.

Some have looked upon the specific gravity of oils as a certain criterion of their genuineness; and accordingly we have given a table of the gravity of several. This, however, is not to be absolutely depended on: for the genuine oils, obtained from the same subjects, often differ in gravity as much as those drawn from different ones. Cinnamon and cloves, whose oils usually sink in water, yield, if slowly and warily distilled, an oil of great fragrancy, which is nevertheless specifically lighter than the aqueous fluid employed in the distillation of it; while, on the other hand, the last runnings of some of the lighter oils prove sometimes so ponderous as to sink in water.

As all essential oils agree in the general properties of solubility in spirit of wine, indissolubility in water, miscibility with water by the intervention of certain intermedia, volatility in the heat of boiling water, &c. it is plain that they may be variously mixed with each other, or the dearer sophisticated with the cheaper, without any possibility of discovering the abuse by any trials of this kind. And indeed it would not be of much advantage to the purchaser, if he had infallible criteria of the genuineness of every individual oil. It is of as much importance that they be good, as that they be genuine; for genuine oils, from inattentive distillation and long and careless keeping, are often weaker both in smell and taste than the common sophisticated ones.

The smell and taste seem to be the only certain tests of which the nature of the thing will admit. If a bark should have in every respect the appearance of good cinnamon, and should be proved indisputably to be the genuine bark of the cinnamon-tree; yet if it want the cinnamon flavour, or has it but in a low degree, we reject it; and the case is the same with the oil. It is only from use and habit, or comparisons with specimens of known quality, that we can judge of the goodness either of the drugs themselves or of their oils.

Most of the essential oils, indeed, are too hot and pungent to be tasted with safety; and the smell of the subject is so much concentrated in them, that a small variation in this respect is not easily distinguished; but we can readily dilute them to any assignable degree. A drop of the oil may be dissolved in spirit of wine, or received on a bit of sugar, and dissolved by that intermedium in water. The quantity of liquor which it thus impregnates with its flavour, or the degree of

flavour

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flavour which it communicates to a certain determinate quantity, will be the measure of the degree of goodness of the oil.

We shall here subjoin the result of some experiments, showing the quantity of essential oil obtained from different vegetables, reduced into the form of a table. The first column contains the names of the respective vegetable substances; the second, the quantity of each which was submitted to the distillation; and the third, the quantity of oil obtained. In every other part of this article, where pound weights are mentioned, the Troy pound of 12 ounces is meant: but these experiments having been all made by a pound of 16 ounces, it was thought expedient to set down the matter of fact in the original weights: especially as the several materials, in the large quantity commonly required for the

distillation of oils, are purchased by weights of the same kind. But to remove any ambiguity which might arise from hence, and to enable the reader to judge more readily of the product, a reduction of the weights is given in the next column; which shows the number of parts of each of the subjects from which one part of oil was obtained. To each article is affixed the author's name from whom the experiment was taken. The different distillations of one subject, several of which are inserted in the table, show how variable the product of oil is, and that the exotic spices, as well as our indigenous plants, do not always contain the same proportion of this active principle; though it must be observed, also, that part of the differences may probably arise from the operation itself having been more or less carefully performed.

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TABLE of the Quantity of ESSENTIAL OIL obtained from different VEGETABLES.

Agallochum wood	10 lb.	4 dra.	320	Hoff.
Angelica root	1 lb.	1 dra.	128	Carth.
Aniseed	1 lb.	4 dra.	32	Neum.
Aniseed	3 lb.	1 oz.	48	Lewis.
Aniseed	4 lb.	1 oz.	64	Lewis.
Asafœtida	4 oz.	1 dra.	32	Neum.
Calamus aromaticus	50 lb.	2 oz.	185	Hoff.
Calamus aromaticus	1 lb.	2 scr.	192	Neum.
Caraway seeds	4 lb.	2 oz.	32	Lewis.
Caraway seeds	2 lb.	9 dra.	28½	Lewis.
Caraway seeds	1 cwt.	83 oz.	21½	Lewis.
Caroline thistle roots	1 lb.	2½ scr.	153	Neum.
Cardamom seeds	1 oz.	1 scr.	24	Neum.
Carrot seeds	2 lb.	1½ dra.	171	Lewis.
Cascarilla	1 lb.	1 dra.	128	Carth.
Camomile flowers	1 lb.	30 gra.	256	Carth.
Common camomile flowers	6 lb.	5 dra.	153	Lewis.
Wild camomile flowers	1 lb.	20 gra.	384	Carth.
Wild camomile flowers	6 lb.	2½ dra.	307	Lewis.
Chervil leaves, fresh	9 lb.	30 gra.	2304	Neum.
Cedar wood	1 lb.	2 dra.	64	Marg.
Cinnamon	1 lb.	1 dra.	128	Sala.
Cinnamon	1 lb.	2½ scr.	153	Neum.
Cinnamon	4 lb.	6 dra.	85½	Lemery.
Cinnamon	1 lb.	2 dra.	64	Carth.
Cinnamon	1 lb.	8 scr.	45½	Carth.
Cinnamon	4 lb.	2 dra.	256	Lewis.
Clary seeds	130 lb.	3½ oz.	594	Lewis.
Clary in flower, fresh	1 lb.	1½ oz.	10½	Teichm.
Cloves	1 lb.	2½ oz.	7½	Carth.
Cloves	2 lb.	5 oz.	6½	Hoff.
Cloves	1 lb.	6 oz.	2½	Hoff.
Copaiba balsam	1 lb.	8 oz.	2	Lewis.
Copaiba balsam	1 bush	21 oz.	2	Lewis.
Cummin-feed	1 lb.	30 gra.	256	Lewis.
Dictamnus Creticus	4 lb.	2 oz.	32	Lewis.
Dill-feed	2 lb.	3½ scr.	245	Neum.
Elecampane root	1 lb.	1 oz.	16	Neum.
Elemi	2 oz.	1 scr.	48	Neum.
Fennel-feed, common	1 bush	18 oz.	48	Lewis.
Fennel-feed, sweet	1 lb.	1 dra.	128	Carth.
Galangal root	2 lb.	30 gra.	256	Neum.
Garlic root, fresh	1 lb.	1 dra.	128	Neum.
Ginger	8 oz.	15 gra.	256	Neum.
Horse-radish root, fresh	2 lb.	1½ dra.	237	Neum.
Hyssop leaves				

yielded of essential oil

so that one part of oil was obtained from

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yielded of essential oil

so that one part of oil was obtained from

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Hyssop

P H A R M A C Y.

Hyssop leaves	1 lb.	1½ dra.	85	Carth.
Hyssop leaves	1 lb.	2 dra.	64	Carth.
Hyssop leaves, fresh	2 ewt.	6 oz.	597	Lewis.
Hyssop leaves, fresh	10 lb.	3 dra.	427	Lewis.
Hyssop leaves, fresh	30 lb.	9 dra.	427	Lewis.
Juniper-berries	8 lb.	3 oz.	42½	Hoff.
Juniper-berries	1 lb.	3 dra.	42½	Carth.
Lavender in flower, fresh	48 lb.	12 oz.	64	Lewis.
Lavender in flower, fresh	30 lb.	6½ oz.	72	Lewis.
Lavender in flower, fresh	13½ lb.	60 oz.	403	Lewis.
Lavender flowers, fresh	2 lb.	4 dra.	64	Hoff.
Lavender flowers, dried	4 lb.	2 oz.	32	Lewis.
Lavender flowers, dried	2 lb.	1 oz.	32	Hoff.
Lavender flowers, dried	4 lb.	3 oz.	21½	Hoff.
Broad-leaved lavender flowers, dry	4 lb.	1 oz.	64	Hoff.
Broad-leaved lavender flowers, dry	1 lb.	2 dra.	64	Carth.
Lovage root	1 lb.	1 dra.	128	Carth.
Mace	1 lb.	5 dra.	25½	Neum.
Mace	1 lb.	6 dra.	21½	Carth.
Marjoram in flower, fresh	81 lb.	3½ oz.	347	Lewis.
Marjoram in flower, fresh	13½ lb.	3½ dra.	493	Lewis.
Marjoram in flower, fresh	34 lb.	1½ oz.	362	Lewis.
Marjoram leaves, fresh	18½ lb.	4 dra.	592	Lewis.
Marjoram leaves, dried	4 lb.	1 oz.	64	Hoff.
Masterwort root	1 lb.	30 gra.	256	Neum.
Milfoil flowers, dried	14 lb.	4 dra.	448	Neum.
Mint in flower, fresh	6 lb.	4½ dra.	177	Neum.
Mint-leaves, dried	4 lb.	1½ oz.	42½	Hoff.
Peppermint, fresh	4 lb.	3 dra.	170½	Hoff.
Myrrh	1 lb.	2 dra.	64	Hoff.
Myrrh	1 lb.	3 dra.	42½	Neum.
Nutmegs	1 lb.	1 oz.	16	Hoff.
Nutmegs	1 lb.	1 oz.	16	Geoff.
Nutmegs	1 lb.	4 dra.	32	Neum.
Nutmegs	1 lb.	6 dra.	21½	Sala.
Nutmegs	1 lb.	5 dra.	25½	Carth.
Parsley seeds	2 lb.	1 dra.	256	Carth.
Parsley leaves, fresh	238 lb.	2 oz.	1904	Carth.
Parsnip seeds	8 lb.	2 dra.	512	Carth.
Pennyroyal in flower, fresh	13 lb.	6 dra.	277	Carth.
Black pepper	2 lb.	6 dra.	42½	Carth.
Black pepper	1 lb.	2½ dra.	82	Neum.
Black pepper	1 lb.	4 scr.	96	Carth.
Black pepper	1 lb.	1 dra.	128	Heister.
Black pepper	6 lb.	3 dra.	256	Geoff.
Pimento	1 oz.	30 gra.	16	Neum.
Rhodium wood	1 lb.	3 dra.	42½	Neum.
Rhodium wood	1 lb.	2 dra.	64	Sala.
Rhodium wood	1 lb.	3 dra.	42½	Sala.
Rhodium wood	1 lb.	3 dra.	42½	Carth.
Rhodium wood	1 lb.	4 dra.	32	Carth.
Rosemary in flower	1 ewt.	8 oz.	224	Lewis.
Rosemary leaves	1 lb.	2 dra.	64	Sala.
Rosemary leaves	1 lb.	3 dra.	42½	Sala.
Rosemary leaves	3 lb.	3½ dra.	121	Neum.
Rosemary leaves	1 lb.	1 dra.	128	Carth.
Rosemary leaves	1 lb.	1½ dra.	82	Carth.
Rosemary leaves, fresh	70 lb.	5 oz.	224	Lewis.
Roses	100 lb.	4 dra.	3200	Tachen.
Roses	100 lb.	1 oz.	1600	Homb.
Roses	12 lb.	30 gra.	768	Hoff.
Rue	10 lb.	2 dra.	640	Hoff.
Rue	10 lb.	4 dra.	320	Hoff.
Rue in flower	4 lb.	1 dra.	512	Hoff.
Rue in flower	60 lb.	2½ oz.	507	Hoff.

yielded of essential oil

so that one part of oil was obtained from

Rue

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Rue with the seeds	72 lb.	3 oz.	384	Hoff.
Saffron	1 lb.	1½ dra.	85½	Vogel.
Sage leaves	1 lb.	5 scr.	77	Carth.
Sage in flower, fresh	34 lb.	1½ oz.	544	Lewis.
Sage of virtue in flower	27 lb.	6 dra.	576	Lewis.
Sage of virtue in flower	8 lb.	1½ dra.	681	Lewis.
Sassafras	6 lb.	1¼ oz.	55	Hoff.
Sassafras	6 lb.	2 oz.	48	Neum.
Savin	2 lb.	5 oz.	6½	Hoff.
Saunders, yellow	1 lb.	2 dra.	64	Carth.
Smallage seeds	1 lb.	2½ scr.	154	Neum.
Stechas in flower, fresh	5½ lb.	2 dra.	368	Lewis.
Thyme in flower, fresh	2 cwt.	5½ oz.	652	Lewis.
Thyme in flower, dry	3½ lb.	1½ dra.	298	Lewis.
Lemon-thyme in flower, fresh	51 lb.	1¼ oz.	653	Lewis.
Lemon thyme in flower, fresh	98 lb.	2½ oz.	627	Lewis.
Lemon-thyme, a little dried	104 lb.	3 oz.	555	Lewis.
Wormwood leaves, dry	4 lb.	1 oz.	64	Lewis.
Wormwood leaves, dry	18 lb.	1½ oz.	192	Lewis.
Wormwood leaves, dry	25 lb.	3½ oz.	114	Lewis.
Zedoary	1 lb.	1 dra.	128	Neum.

yielded of essential oil

so that one part of oil was obtained from

Prepara-
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CHAP. VII. Salts.

Diluted or weak vitriolic acid. L.

196. Take of vitriolic acid, one ounce by weight; distilled water, 8 ounces by weight. Mix them by degrees.

Weak vitriolic acid, commonly called weak spirit of vitriol. E.

Take of vitriolic acid, one part; water, seven parts. Mix them.

In the former editions of our pharmacopœias, directions were given for the preparation of the vitriolic acid by the apothecary himself, under the heads of *spirit and oil of vitriol, spirit or oil of sulphur by the bell, &c.*; but as it is now found that all these modes are expensive, and that this acid may be furnished at a cheaper rate from the trading chemists preparing it on a large scale, it is with propriety that both colleges have now rejected it from the preparations, and introduced it only into the list of the materia medica.

When, however, it is of the degree of concentration there required, it can be employed for very few purposes in medicine. The most simple form in which it can be advantageously employed internally, is that in which it is merely diluted with water: and it is highly proper that there should be some fixed standard in which the acid in this state should be kept. It is, however, much to be regretted, that the London and Edinburgh colleges have not adopted the same standard with respect to strength: for in the one, the strong acid constitutes an eighth; and in the other, only a ninth of the mixture. The former proportion, which is that of the Edinburgh college, we are inclined to prefer, as it gives exactly a dram of acid to the ounce: but the dilution by means of distilled water, which is directed by the London, is preferable to spring-water; which, even in its purest state, is rarely free from impregnations in part affecting the acid.

The acid of vitriol is the most ponderous of all the liquids we are acquainted with, and the most powerful of the acids. If any other acid be united with a fixed alkaline salt or earth, on the addition of the vitriolic,

such acid will be dislodged, and arise on applying a moderate heat, leaving the vitriolic in possession of the alkali; though without this addition it would not yield to the most vehement fire. Mixed with water, it instantly creates great heat, inasmuch that glass vessels are apt to crack from the mixture, unless it be very slowly performed: exposed to the air, it imbibes moisture, and soon acquires a remarkable increase of weight. In medicine, it is employed chiefly as subservient to other preparations: it is also frequently mixed with juleps and the like, in such quantity as will be sufficient to give the liquor an agreeable tartness, and it then is a cooling antiseptic, a restringent, and a stomachic.

It is particularly useful for allaying inordinate actions of the stomach, when under the form of singultus or vomiting. For its medical properties, see ACIDS and VITRIOL.

Nitrous acid. L.

Take of purified nitre, by weight, 60 ounces; vitriolic acid, by weight, 29 ounces. Mix and distil.

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The specific gravity of this is to the weight of distilled water as 1550 to 1000.

Nitrous acid, commonly called Glauber's spirit of nitre. E.

Take of purest nitre, bruised, two pounds; vitriolic acid, one pound. Having put the nitre into a glass retort, pour on it the spirit; then distil in a sand-heat, gradually increasing the fire, till the sand-pot becomes of a dull red colour.

Here the vitriolic acid expels the nitrous, in red corrosive vapours, which begin to issue immediately on mixture; and which the operator ought cautiously to avoid. A pound of acid of vitriol is sufficient to expel all the acid from about two pounds of nitre, not from more: some direct equal parts of the two. The spirit, in either case, is in quality the same; the difference, in this respect, affecting only the residuum. If two parts of nitre be taken to one of vitriolic acid, the remaining alkaline basis of the nitre is completely saturated with the vitriolic acid; and the result is a neutral salt, the same with vitriolated tartar, as we shall

shall see hereafter. If more nitre be used, a part of the nitre in substance will remain blended with this neutral salt: if less nitre, it cannot afford alkali enough to saturate the vitriolic acid, and the residuum will not be a neutral salt, but a very acid one. In this last case there is one conveniency; the acid salt being readily soluble in water, so as to be got out without breaking the retort, which the others are not.

Diluted or weak nitrous acid. L.

- 198 Take of nitrous acid, distilled water, each one pound.
Mix them.

Weak nitrous acid. E.

Take of nitrous acid, water, equal weights. Mix them, taking care to avoid the noxious vapours.

In the old editions both of the London and Edinburgh pharmacopœias, directions were given for the preparation of aquafortis simplex and duplex; but these were no more than different forms of preparing an impure nitrous acid, unfit for medical purposes. They are therefore, with propriety, superseded by the more simple formulæ of nitrous acid and diluted or weak nitrous acid, mentioned above. In making the diluted acid, distilled water is preferable to common water.

The vapour separated during the mixing of nitrous acid and water, is the permanently elastic fluid called *nitrous acid air*, which is deleterious to animal life.

The acid of nitre is next in strength to the vitriolic, and dislodges all others from alkaline salts or earths. It differs from all the other acids in deflagrating with inflammable matters: if a solution of any inflammable substance, as hartshorn, &c. in this acid, be set to evaporate, as soon as the matter approaches to dryness, a violent detonation ensues. The chief use of this acid is as a menstruum for certain minerals, and as the basis of some particular preparations to be mentioned hereafter. It has been given likewise, diluted with any convenient vehicle, as a diuretic, from 10 to 50 drops.

Muriatic acid. L.

- 199 Take of dry sea-salt, 10 pounds; vitriolic acid, six pounds; water, five pounds. Add the vitriolic acid first mixed with the water by degrees, to the salt; then distil.

The specific gravity of this acid is to distilled water as 1170 to 1000.

Muriatic acid, commonly called spirit of sea-salt. E.

Take of sea-salt, two pounds; vitriolic acid, water, each one pound. Let the salt be first put into a pot, and brought to a red heat, that the oily impurities may be consumed; then put it into the retort. Next mix the acid with the water, and when the mixture has cooled, pour it upon the salt. Lastly, distil in a sand heat with a middling heat, as long as any acid comes over.

The marine, or muriatic acid, arises, not in red fumes like the nitrous, but in white ones. The addition of water is more necessary here than in the foregoing process; the marine vapours being so volatile, as scarcely to condense without some adventitious humidity. The acid of vitriol is most conveniently mix-

ed with the water in an earthen or stone-ware vessel: Preparations and Compositions. for unless the mixture be made exceedingly slow, it grows so hot as to endanger breaking a glass one.

The spirit of sea-salt is the weakest of the mineral acids, but stronger than any of the vegetable: it requires a greater fire to distil it than that of nitre, yet it is more readily dissipated by the action of the air. It is used chiefly as a menstruum for the making of other preparations; sometimes, likewise, it is given, properly diluted, as an antiphlogistic, aperient, and diuretic, from 10 to 60 or 70 drops.

Distilled vinegar.

Take of vinegar five pints. Distil with a gentle fire, in glass vessels, so long as the drops fall free from empyreuma. L.

Let eight pounds of vinegar be distilled in glass vessels with a gentle heat. Let the two first pounds that come over be thrown away as containing too much water; let four pounds next following be reserved as the distilled vinegar. What remains is a still stronger acid, but too much acted on by the heat. E.

This process may be performed either in a common still with its head, or in a retort. The better kinds of wine-vinegar should be used: those prepared from malt liquors, however fine and clear they may seem to be, contain a large quantity of a viscous substance, as appears from the slimyness and ropyness to which they are very much subject: this not only hinders the acid parts from rising freely, but likewise is apt to make the vinegar boil over into the recipient, and at the same time disposes it to receive a disagreeable impression from the fire. And indeed, with the best kind of vinegar, if the distillation be carried on to any great length, it is extremely difficult to avoid an empyreuma. The best method of preventing this inconvenience is, if a retort be used, to place the sand but a little way up its sides, and when somewhat more than half the liquor is come over, to pour on the remainder a quantity of fresh vinegar equal to the liquor drawn off. This may be repeated three or four times; the vinegar supplied at each time being previously heated. The addition of cold liquor would not only prolong the operation, but also endanger the breaking of the retort. If the common still be employed, it should likewise be occasionally supplied with fresh vinegar in proportion as the spirit runs off; and this continued until the process can be conveniently carried no farther: the distilled spirit must be rectified by a second distillation in a retort or glass alembic; for although the head and receiver be of glass or stone ware, the acid will contract a metallic taint from the pewter worm.

The residuum of this process is commonly thrown away as useless, although, if skilfully managed, it might be made to turn to good account; the most acid parts of the vinegar still remaining in it. Mixed with about three times its weight of fine dry sand, and committed to distillation in a retort, with a well-regulated fire, it yields an exceeding strong acid spirit, together with an empyreumatic oil, which taints the spirit with a disagreeable odour. This acid is nevertheless, without any rectification, better for some purposes (as a little

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of it will go a great way) than the pure spirit; particularly for making the diuretic or acetated kali of the London college; for there the oily matter, on which its ill flavour depends, is burnt out by the calcination.

The spirit of vinegar is a purer and stronger acid than vinegar itself, with which it agrees in other respects. (See VINEGAR). Their principal difference from the mineral acid consists in their being milder, less stimulating, less disposed to affect the kidneys and promote the urinary secretions, or to coagulate the animal juices. The matter left after the distillation in glass vessels, though not used in medicine, would doubtless prove a serviceable detergent saponaceous acid; and in this light stands recommended by Boerhaave.

Concentrated vinegar. Succ.

- 201 Let white wine vinegar be frozen in a wooden vessel in cold winter weather; and let the fluid separated from the ice be preserved for use. It may be considered as sufficiently strong, if one dram of it be capable of saturating a scruple of the fixed vegetable alkali.

This is a very easy mode for obtaining the acid of vinegar in a concentrated state, and freed from a considerable portion of its water. But at the same time we do not thus obtain the acid either so much concentrated, or in so pure a state as by the following process.

Acetous acid. L.

- 202 Take of verdegriſe, in coarse powder, two pounds. Dry it perfectly by means of a water-bath saturated with sea-salt; then distil it in a sand-bath, and after that distil the liquor. Its specific gravity is to that of distilled water as 1050 to 1000.

By this process, it may be readily concluded that we obtain the acetous acid in its most concentrated state, and with the least admixture of water. And after the re-distillation, it may also be supposed that it will be free from all mixture of the copper. But the internal use of it has been objected to by some, on the supposition that it may still retain a portion of the metal; and hitherto it has, we believe, been but little employed.

Cryſtallized acid of tartar. Succ.

- 203 Take of prepared chalk, frequently washed with warm water, two pounds; spring water, 32 pounds. After slight boiling, by degrees add of cream of tartar 7 pounds, or as much as is sufficient for saturation. Removing the vessel from the fire, let it stand for half an hour, then cautiously pour off the clear liquor into a glass vessel. Wash the residuum or tartareous selenites by pouring water on it three or four times. To this residuum afterwards add of weak vitriolic acid 16 pounds, let it be digested for a day, frequently stirring it with a wooden spatula. After this pour the acid liquor into a glass vessel: but with the residuum mix 16 pounds of spring water; strain it through paper, and again pour water on the residuum till it become insipid. Let the acid liquors mixed together in a glass vessel be boiled to the consistence of a thin syrup; which being strained, must be set apart for the formation of crystals. Let the crystals collected after repeated distillations

be dried on paper, and afterwards kept in a dry place.

If before crystallization a little of the inspissated acid liquor be diluted with four times its quantity of pure water, and a few drops of vinegar of litharge be put into it, a white sediment will immediately be deposited. If a few drops of the diluted nitrous acid be then added, the mixture will become limpid, if the tartareous liquor be pure and entirely free from the vitriolic acid; but if it be not, it will become white. This fault, however, may be corrected, if the acid of tartar be diluted with six pounds of water and a few ounces of the tartareous selenites be added to it. After this it may be digested, strained, and crystallized.

By this process, the acid of tartar may be obtained in a pure solid form. It would, however, be perhaps an improvement of the process, if quicklime were employed in place of chalk. For Dr Black has found that quicklime absorbs the whole of the tartareous acid, and then the supernatant liquor contains only the alkaline part of the tartar; whereas, when chalk is employed, it contains a solution of soluble tartar, the chalk taking up only the superabundant acid. By this method then a greater quantity of tartareous acid might be obtained from the sediment. The tartareous acid has not hitherto been much employed in its pure state. But besides being useful for some purposes in medicine, for which the cream of tartar is at present in use, and where that supersaturated neutral may be less proper, there is also reason to suppose, that from the employment of the pure acid, we should arrive at more certainty in the preparation of the antimonium tartarizatum, or tartar emetic, than by employing the cream of tartar, the proportion of acid in which varies very much from different circumstances. The pure acid of tartar might also probably be employed with advantage for bringing other metallic substances to a saline state.

Distilled acid of tartar. Succ.

Let pounded crude tartar be put into a tubulated earthen or iron retort till it fills about two-thirds of it, and let distillation be performed by gradually increasing the heat. Into the recipient, which should be very large, an acid liquor will pass over together with the oil; which being separated from the oil, must again be distilled from a glass retort. If the residuum contained in the earthen or iron retort be diluted with water, strained through paper, and boiled to dryness, it gives what is called the *alkali* of tartar. If this do not appear white, it may be made so by burning, solution, straining, and evaporation.

This is another mode of obtaining both the acid and alkali of tartar in a pretty pure state; and, as well as the former, it is not unworthy of being adopted into our pharmacopœias.

Aerated water. Ross.

Let spring water be saturated with the fixed air, or aerial acid, arising from a solution of chalk in vitriolic acid, or in any similar acid. Water may also be impregnated by the fixed air rising from fermenting liquors.

The aerial acid, on which we have already had occasion

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to make some observations, besides the great influence which it has as affecting different saline bodies into whose composition it enters, is also frequently employed in medicine, with a view to its action on the human body. The late ingenious Dr Dobson, in his Commentary on Fixed Air, has pointed out many purposes for which it may be usefully employed, and several different forms under which it may be used. But there is no form under which it is at present more frequently had recourse to than that of aerated or mephitic water, as it has often been called. And although not yet received either into the London or Edinburgh pharmacopœias, it is daily employed in practice, and is we think justly intitled to a place among the saline preparations.

The most convenient mode of impregnating water with the aerial acid, and thus having it in our power to exhibit that acid as it were in a diluted state, is by means of a well known and sufficiently simple apparatus, contrived by that ingenious philosopher Dr Nooth. Such a machine ought, we think, to be kept in every shop for the more ready preparation of this fluid. Water properly impregnated with the aerial acid has an agreeable acidulous taste. It is often employed with great advantage in the way of common drink, by those who are subjected to stomach complaints, and by calculous patients. But, besides this, it furnishes an excellent vehicle for the exhibition of many other medicines.

Besides the simple aerated water, the Pharmacopœia Rossica contains also an aqua aëris fixi martialis, or ferruginous aerated water. This is prepared by suspending iron wires in that water till the water be fully saturated with the metal. And in consequence of this acid, simple water becomes a menstruum both for different metallic and earthy substances. But water in this state may be considered rather as fitted for those purposes for which chalybeates are in use, than as a preparation of the aerial acid.

Salt and oil of amber. L.

206 Take of amber two pounds. Distil in a sand heat, gradually augmented: an acid liquor, oil, and salt impregnated with oil, will ascend.

On this article we have already offered some observations under the head of Essential Oils. The directions here given by the London college differ chiefly from those of the Edinburgh college formerly mentioned, in no sand being employed: But when care is taken that the sand be pure, it can give no improper impregnation to the medicine, and may prevent some inconveniences in the distillation, particularly that of the amber rising in substance into the receiver.

Purified salt of amber. L.

207 Take of salt of amber half a pound; distilled water, one pint. Boil the salt in the distilled water, and set aside the solution to crystallize.

Salt of amber, when perfectly pure, is white, of an acid taste, and not ungrateful. It requires, for its solution, of cold water, in summer, about twenty times its weight; and of boiling water about twice its weight; it is scarcely soluble in rectified spirit without the assistance of heat.

It is given as a cooling diuretic in doses of a few grains, and also in hysterical complaints.

Flowers of benzoin.

Take of benzoin, in powder, one pound. Put it into an earthen pot, placed in sand; and, with a slow fire, sublime the flowers into a paper cone fitted to the pot.

If the flowers be of a yellow colour, mix them with white clay, and sublime them a second time. *L.*

Put any quantity of powdered benzoin into an earthen pot, to which, after fitting it with a large conical paper cap, apply a gentle heat that the flowers may sublime. If the flowers be impregnated with oil, let them be purified by solution in warm water and crystallization. *E.*

Benzoin, exposed in a retort to a gentle fire, melts, and sends up into the neck white, shining crystalline flowers, which are followed by an oily substance. These flowers, which are at present considered as a peculiar acid, are by some termed *acidum benzoicum*. On raising the heat a little (a recipient being applied to the neck of the retort), a thin yellowish oil comes over, intermingled with an acid liquor, and afterwards a thick butyraceous substance: this last, liquefied in boiling water, gives out to it a considerable quantity of saline matter (separable by filtration and proper exhalation), which appears in all respects similar to the flowers.

It appears, therefore, that the whole quantity of flowers which benzoin is capable of yielding, cannot be obtained by the above processes, since a considerable portion arises after the time of their being discontinued. The greatest part of the flowers arise with a less degree of heat than what is necessary to elevate the oil; but if the operation be hastily conducted, or if the fire be not exceedingly gentle, the oil will arise along with the flowers, and render them foul. Hence in the way of trade, it is extremely difficult to prepare them of the requisite whiteness and purity; the heat which becomes necessary, when large quantities of the benzoin are employed, being so great as to force over some of the oil along with them.

In order, therefore, to obtain these flowers in perfection, only a small quantity of benzoin should be put into the vessel at a time; and that this may not be any impediment to the requisite dispatch, a number of shallow, flat-bottomed, earthen dishes may be employed, each fitted with another vessel inverted over it, or a paper cone. With these you may fill a sand furnace; having fresh dishes charged in readiness to replace those in the furnace, as soon as the process shall appear finished in them: the residuum of the benzoin should be scraped out of each of the vessels before a fresh parcel be put in.

These flowers, when made in perfection, have an agreeable taste and fragrant smell. They totally dissolve in spirit of wine; and likewise, by the assistance of heat, in water; but separate again from the latter upon the liquor's growing cold, shooting into saline spicula, which unite together into irregular masses. By the mediation of sugar they remain suspended in cold water, and thus form an elegant balsamic syrup. Some have held them in great esteem as pectoral and

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sudorific, in the dose of half a scruple or more: but at present they are rarely used, on account of the offensive oil which, as usually prepared, they are tainted with, and from which a fresh sublimation from tobacco-pipe clay, as formerly practised, did not free them so effectually as might be wished. The observations above related, point out the method of depurating them more perfectly, viz. by solution, filtration, and crystallization.

They enter the composition of the pargoric elixir, or tinctura opii camphorata, as it is now called.

Salt of tartar. E.

209 Take of tartar, what quantity you please. Roll it up in a piece of moist bibulous paper, or put it into a crucible, and surrounding it with live coals, burn it to a coal; next, having beat this coal, calcine it in an open crucible with a moderate heat, taking care that it do not melt, and continue the calcination till the coal becomes of a white, or at least of an ash, colour. Then dissolve it in warm water; strain the liquor through a cloth, and evaporate it in a clean iron vessel; diligently stirring it towards the end of the process with an iron spatula, to prevent it from sticking to the bottom of the vessel. A very white salt will remain, which is to be left a little longer on the fire, till the bottom of the vessel becomes almost red. Lastly, when the salt is grown cold, let it be put up in glass vessels well shut.

Native tartar is a saline substance, compounded of an acid, of a fixed alkali, and of oily, viscous, and colouring matter. The purpose of the above process is, to free it from every other matter but the fixed alkali. From the mistaken notion that tartar was essentially an acid mixed only with impurities, it has been generally supposed that the effect of this operation was the conversion of an acid into an alkali by means of heat. But since Mr Scheele has discovered that the proper matter of tartar, freed from the oily and colouring parts, is really a salt compounded of an acid, which is predominant, and a fixed alkali, we have no farther need of such an obscure theory. The acid of the tartar by this process is dissipated by means of the heat: and the oily, viscous, and colouring matters, are partly dissipated, and partly brought to the state of insoluble earthy matter, easily separable by the future lixiviation from the alkali, wherewith they were loosely combined. But by the last of these processes, something farther is carried on than the separation of the more palpable foreign matters. By allowing the salt, freed from the water of the lixivium, to remain on the fire till the bottom of the vessel become almost red, any oily matter that may still be present seems to be decomposed by the united action of the heat and fixed alkali, forming with a part of the latter, by their reciprocal action, a volatile alkaline salt, which is forthwith discharged in elastic vapours. Besides the complete discharge of the above principles, the remaining fixed alkali also suffers a considerable loss of its fixed air, or aerial acid; with which, when fully saturated, it forms the imperfect neutral salt, denominated by Dr Black *mild fixed alkali*: on this account it is somewhat caustic, considerably deliquescent, and in proportion to its possessing these properties more or less, it more or less nearly approaches to the state of pure alkali. It is not, how-

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ever, so effectually deprived of fixed air as to be sufficiently caustic for a number of purposes. Where causticity is not required, the salt thus purified is abundantly fit for most pharmaceutical purposes; but as native tartar generally contains small portions of neutral salts besides the foreign matters already noticed, it is necessary, if we wish to have a very pure alkali for nice operations, to employ crystallization and other means, beside the process here directed.

The white and red sorts of tartar are equally fit for the purpose of making fixed salt; the only difference is, that the white affords a somewhat larger quantity than the other: from 16 ounces of this sort, upwards of four ounces of fixed alkaline salt may be obtained. The use of the paper is to prevent the smaller pieces of the tartar from dropping down into the ash-hole, through the interstices of the coals, upon first injecting it into the furnace.

The calcination of the salt (if the tartar was sufficiently burnt at first) does not increase its strength so much as is supposed: nor is the greenish or blue colour any certain mark either of its strength, or of its having been, as was formerly supposed, long exposed to a vehement fire: for if the crucible be perfectly clean, close covered, and has stood the fire without cracking, the salt will turn out white, though kept melted and reverberated ever so long; while, on the other hand, a slight crack happening in the crucible, or a spark of coal falling in, will in a few minutes give the salt the colour admired. The colour, in reality, is a mark rather of its containing some inflammable matter than of its strength.

The vegetable alkali prepared from tartar has now no place in the London pharmacopœia, or at least it is included under the following article.

Prepared kali. L.

210 Take of pot-ash, two pounds; boiling distilled water, three pints. Dissolve and filtre through paper; evaporate the liquor till a pellicle appears on the surface; then set it aside for a night, that the neutral salts may crystallize; after which pour out the liquor, and boil away the whole of the water, constantly stirring, lest any salt should adhere to the pot. In like manner is purified impure kali from the ashes of any kind of vegetable. The same salt may be prepared from tartar burnt till it becomes of an ash-colour.

Fixed vegetable alkaline salt purified. E.

211 Let the fixed alkaline salt, called in English *pearl-ashes*, be put into a crucible, and brought to a somewhat red heat, that the oily impurities, if there be any, may be consumed; then having beat and agitated it with an equal weight of water, let them be well mixed. After the feces have subsided, pour the ley into a very clean iron pot, and boil to dryness, diligently stirring the salt towards the end of the process, to prevent its sticking to the vessel. This salt, if it hath been rightly purified, though it be very dry, if rubbed with an equal weight of water, may be dissolved into a liquor void of colour or smell.

The potash used in commerce is an alkali mixed with a considerable quantity of remaining charcoal, U u sulphur,

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fulphur, vitriolated tartar, and oily matter. In the large manufactures, the alkaline part is indeed considerably freed from impurities by mixing the weed-ashes with water, evaporating the clear ley, and burning the residuum in an oven; but besides that this process is insufficient for the complete separation of the impurities, it also superadds a quantity of stony matter, giving to the alkali the *pearl* appearance (whence its name), and rendering it altogether unfit for pharmaceutical purposes. By the processes here directed, the alkali is effectually freed from all these heterogeneous matters, excepting perhaps a small proportion of vitriolated tartar, or other neutral salts, which may very generally be neglected. As in the process no after calcination is directed, it is probable that the fixed alkali thus prepared will not prove so caustic, that is to say, is not so considerably deprived of fixed air, as in the process directed for preparing the salt of tartar. It is, however, sufficiently pure for most purposes: and we consider the above process as the most convenient and cheap method of obtaining the vegetable fixed alkali in its mild state.

The purified vegetable alkali has been known in our pharmacopœias under the different names of *salt of worm-wood*, *salt of tartar*, &c. But all these being now known to be really the same, the terms, as leading to error, have been with justice expunged; and it has been a desideratum to discover some short name equally applicable to the whole. The term employed by the Edinburgh college is too long, being rather a description than a name; but to that employed by the London college, *Kali*, objections have also been made. And it must be allowed, that besides the inconvenience which arises from its being an indeclinable word, the fossil alkali is equally intitled to the same appellation. Besides this, as a considerable portion of the fossil alkali is prepared from burning a vegetable growing on the sea-coasts, which has the name of *kali*, the *Kali spinosum* of Linné, some apparent contradiction and ambiguity may thence arise. And the London college would perhaps have done better, if they had adopted the term *Potassa*; a name which has been appropriated to this salt by some of the most eminent modern chemists.

The purified potassa is frequently employed in medicine, in conjunction with other articles, particularly for the formation of saline neutral draughts and mixtures: But it is used also by itself in doses from three or four grains to 15 or 20; and it frequently operates as a powerful diuretic, particularly when aided by proper dilution. See *PEARL-ASH* and *POT-ASH*.

Water of kali. L.

312 Take of kali, one pound, set it by in a moist place till it be dissolved, and then strain it.

This article had a place in former editions of our pharmacopœias under the titles of *ley of tartar*, or *oil of tartar per deliquium*, &c. It is, however, to be considered as a mere watery solution of the mild vegetable alkali, formed by its attracting moisture from the air; and therefore it is with propriety styled the *water of kali*.

The solutions of fixed alkaline salts, made by exposing them to a moist air, are generally considered

as being purer than those made by applying water directly: for though the salt be repeatedly dissolved in water, filtered, and exsiccated; yet, on being li-
quefied by the humidity of the air, it will still depo-
site a portion of earthy matter: but it must be ob-
served, that the exsiccated salt leaves always an earthy matter on being dissolved in water, as well as on being deliquated in the air. Whether it leaves more in the one way than in the other, is not determined with precision. The deliquated lixivium is said to contain nearly one part of alkaline salt to three of an aqueous fluid. It is indifferent, in regard to the lixivium itself, whether the white ashes of tartar, or the salt extracted from them, be used; but as the ashes leave a much greater quantity of earth, the separation of the ley proves more troublesome.

The water of kali of the present edition of the London pharmacopœia, then, may be considered as an improvement of the lixivium tartari of their former edition. But the Edinburgh college, considering this solution as being in no respect different from that made by pure water, have entirely rejected this preparation from their pharmacopœia, and probably with justice.

Water of pure kali. L.

Take of kali, four pounds; quicklime, six pounds; distilled water, four gallons. Put four pints of water to the lime, and let them stand together for an hour; after which, add the kali and the rest of the water; then boil for a quarter of an hour: suffer the liquor to cool, and strain. A pint of this liquor ought to weigh 16 ounces. If the liquor effervesces with any acid, add more lime.

A preparation similar to this had a place in the former edition of the London pharmacopœia, under the title of *soap-ley*. Quicklime, by depriving the mild alkali of its aerial acid, renders it caustic: hence this ley is much more acrimonious, and acts more powerfully as a menstruum of oils, fats, &c. than a solution of the potassa alone. The lime should be used fresh from the kiln; by long keeping, even in close vessels, it loses its strength: such should be made choice of as is thoroughly burnt or calcined, which may be known by its comparative lightness.

All the instruments employed in this process should be either of wood, earthen ware, or glass: the common metallic ones would be corroded by the ley, so as either to discolour or communicate disagreeable qualities to it. If it should be needful to filter or strain the liquor, care must be taken that the filter or strainer be of vegetable matter: woollen, silk, and that sort of filtering paper which is made of animal substances, are quickly corroded and dissolved by it.

The liquor is most conveniently weighed in a narrow-necked glass bottle, of such a size, that the measure of a wine pint may arise some height into its neck; the place to which it reaches being marked with a diamond. A pint of the common leys of our soap-makers weighs more than 16 ounces: it has been found that their soap-ley will be reduced to the standard here proposed, by mixing it with something less than an equal measure of water.

Although this liquor is indeed pure alkali dissolved in water, yet we are inclined to give the preference

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to the name employed by the Edinburgh college, as well as to the modes of preparing it, directed in the following formula.

Caustic ley. E.

214 Take of fresh burnt quicklime, eight ounces; purified fixed vegetable alkaline salt, six ounces. Throw the quicklime, with 28 ounces of warm water, into an iron or earthen vessel. The ebullition and extinction of the lime being perfectly finished, instantly add the alkaline salt; and having thoroughly mixed them, shut the vessel till it cools. Stir the cooled matter, and pour out the whole into a glass funnel, whose throat must be stopped up with a piece of clean rag. Let the upper mouth of the funnel be covered, while the tube of it is inserted into a glass vessel, so that the ley may gradually drop through the rag into that vessel. When it first gives over dropping, pour into the funnel some ounces of water; but cautiously, and in such a manner, that the water shall swim above the matter. The ley will again begin to drop, and the affusion of water is to be repeated in the same manner, until three pounds have dropped, which takes up the space of two or three days; then agitating the superior and inferior parts of the ley together, mix them, and put up the liquor in a well-shut vessel.

If the ley be rightly prepared, it will be void of colour or smell; nor will it raise an effervescence with acids, except perhaps a very slight one. Colour and odour denote the salt not sufficiently calcined; and effervescence, that the quicklime has not been good.

The reasons and propriety of the different steps in the above process will be best understood by studying the theory on which it is founded. The principle of mildness in all alkaline salts, whether fixed or volatile, vegetable or fossil, is very evidently fixed air, or the aerial acid: But as quicklime has a greater attraction for fixed air than any of these salts, so if this substance be presented to any of them, they are thereby deprived of their fixed air, and forthwith become caustic. This is what precisely happens in the above processes. The propriety of closely shutting the vessels through almost every step of the operation, is sufficiently obvious; viz. to prevent the absorption of fixed air from the atmosphere, which might defeat our intentions. When only a piece of cloth is put into the throat of the funnel, the operation is much more tedious, because the pores of the cloth are soon blocked up with the wet powdery matter. To prevent this, it may be convenient to place above the cloth a piece of fine Fly's wirework; but as metallic matters are apt to be corroded, the method used by Dr Black is the most eligible. The Doctor first drops a rugged stone into the tube of the funnel, in a certain place of which it forms itself a firm bed, while the inequalities on its surface afford interstices of sufficient size for the passage of the filtering liquor. On the upper surface of this stone he puts a thin layer of flat or clean tow; immediately above this, but not in contact with it, he drops a stone similar to the former, and of a size proportioned to the swell in the

upper part of the tube of the funnel. The interstices between this second stone and the funnel are filled up with stones of a less dimension, and the gradation uniformly continued till pretty small sand is employed. Finally, this is covered with a layer of coarser sand and small stones to sustain the weight of the matter, and to prevent its being inviscated in the minute interstices of the fine sand. The throat of the funnel being thus built up, the stony fabric is to be freed of clay and other adhering impurities, by making clean water pass through it till the water comes clear and transparent from the extremity of the funnel. It is obvious, that in this contrivance, the author has, as usual, copied nature in the means she employs to depurate watery matters in the bowels of the earth; and it might be usefully applied for the filtration of various other fluids.

It is a very necessary caution to pour the water gently into the funnel; for if it be thrown in a forcible stream, a quantity of the powdery matter will be washed down, and render all our previous labour useless. That part of the ley holding the greatest quantity of salt in solution will no doubt be heaviest, and will consequently sink lowest in the vessel: the agitation of the ley is therefore necessary, in order to procure a solution of uniform strength through all its parts. If the salt has been previously freed of oily and other inflammable matters, this ley will be colourless and void of smell. If the quicklime has been so effectually deprived of its own fixed air, as to be able to absorb the whole of that in the alkali, the ley will make no effervescence with acids, being now deprived of fixed air, to the discharge of which by acids this appearance is to be ascribed in the mild or aerated alkalis.

The caustic ley is therefore to be considered as a solution of pure alkali in water. See the article *FIXED AIR*.

It may be proper to observe, for the sake of understanding the whole of the theory of the above process, that while the alkali has become caustic, from being deprived of fixed air by the quicklime, the lime has in its turn become mild and insoluble in water from having received the fixed air of the alkali.

The caustic ley, under various pompous names, has been much used as a lithontriptic; but its fame is now beginning to decline. In acidities in the stomach, attended with much flatulence and laxity, the caustic ley is better adapted than mild alkalis; as in its union with the acid matter it does not separate air. When covered with mucilaginous matters, it may be safely taken into the stomach: and by stimulating, it coincides with the other intentions of cure; by some dyspeptic patients it has been employed with advantage.

Pure kali. L.

Take of water of pure kali, one gallon. Evaporate it to dryness; after which let the salt melt on the fire, and pour it out. 215

The strongest common caustic. E.

Take of caustic ley, what quantity you please. Evaporate it in a very clean iron vessel on a gentle fire till, 216

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till, on the ebullition ceasing, the saline matter gently flows like oil, which happens before the vessel becomes red. Pour out the caustic thus liquefied on a smooth iron plate; let it be divided into small pieces before it hardens, which are to be kept in well-shut phials.

These preparations may be considered as differing in no essential particular. But the directions given by the Edinburgh college are the most precise and distinct.

The effect of the above processes is simply to discharge the water of the solution, whereby the causticity of the alkali is more concentrated in any given quantity. These preparations are strong and sudden caustics. The caustic prepared in this way has an inconvenience of being apt to liquefy too much on the part to which it is applied, so that it is not easily confined within the limits in which it is intended to operate; and indeed the suddenness of its action depends on this disposition to liquefy.

Lime with pure kali. L.

- 217 Take of quicklime, five pounds and four ounces; water of pure kali, 16 pounds by weight. Boil away the water of pure kali to a fourth part; then sprinkle in the lime, reduced to powder by the affusion of water. Keep it in a vessel close stopped.

The milder common caustic. E.

- 218 Take of caustic ley, what quantity you please. Evaporate in an iron vessel till one-third remains; then mix with it as much new slaked quicklime as will bring it to the consistence of pretty solid pap, which is to be kept in a vessel closely stopped.

These preparations do not essentially differ from each other, while the chief difference between the present formula and that which stood in the last edition of the London pharmacopœia is in the name. It was then styled the *strongest common caustic*.

Here the addition of lime in substance renders the preparation less apt to liquefy than the foregoing, and consequently it is more easily confinable within the intended limits, but proportionally slower in its operation. The design of keeping or of slaking the lime is, that its acrimony may be somewhat abated.

Exposed long to the air, these preparations gradually resume their power of effervescence, and lose proportionally the additional activity which the quicklime had produced in them.

Prepared natron. L.

- 219 Take of barilla, powdered, two pounds; distilled water, one gallon. Boil the barilla in four pints of water for half an hour, and strain. Boil that part which remains after straining with the rest of the water, and strain. Evaporate the mixed liquors to two pints, and set them by for eight days; strain this liquor again; and, after due boiling, set it aside to crystallize. Dissolve the crystals in distilled water; strain the solution, boil, and set it aside to crystallize.

The name of *natron*, here used by the London college for the fixed fossil alkali, has, as well as their name for the vegetable alkali, been objected to. And though they are here supported by the authority of

the ancients, yet perhaps they would have done better in following the best modern chemists by employing the term *salt of soda*. This article differs in name only from the following.

Fixed fossil alkaline salt purified. E.

Take of ashes of Spanish kali, commonly called *soda* or *barilla*, as much as you please. Bruise them; then boil in water till all the salt be dissolved. Strain this through paper, and evaporate in an iron vessel, so that after the liquor has cooled the salt may concrete into crystals.

By the above processes, the fossil alkali is obtained sufficiently pure, being much more disposed to crystallize than the vegetable alkali; the admixture of this last, objected to by Dr Lewis, is hereby in a great measure prevented.

It is with great propriety, that in this, as well as many other processes, the London college direct the use of distilled water, as being free from every impregnation.

The natron, or fossil alkali, is found lying on the ground in the island of Teneriff, and some other countries. The native productions of this salt seem to have been better known to the ancients than to late naturalists; and it is, with good reason, supposed to be the nitre of the Bible. How far the native natron may supersede artificial means to procure it from mixed bodies, we have not been able to learn with certainty.

The fossil alkali is not only a constituent of different neutrals, but is also sometimes employed as a medicine by itself. And in its purified state it has been by some reckoned useful in affections of the scrofulous kind. See NATRUM.

Prepared ammonia. L.

- Take of sal ammoniac, powdered, one pound; prepared chalk, two pounds. Mix and sublime. 221

Water of ammonia. L.

- Take of sal ammoniac, one pound; pot-ash, one pound and a half; water, four pints. Draw off two pints, by distillation, with a slow fire. 222

Volatile alkali from sal ammoniac, commonly called volatile sal ammoniac.

- Take of sal ammoniac, one pound; chalk, very pure and dry, two pounds; mix them well, and sublime from a retort into a refrigerated receiver. 223

Spirit of sal ammoniac. E.

- Take sal ammoniac, purified vegetable fixed alkali, of each sixteen ounces; water, two pounds. Having mixed the salts, and put them into a glass retort, pour in the water; then distil to dryness with a sand-bath, gradually raising the heat. 224

These articles, which in the last edition of the London pharmacopœia were styled *the volatile salt and spirit of sal ammoniac*, were then directed to be prepared in the same manner.

Sal ammoniac is a neutral salt, composed of volatile alkali and marine acid. In these processes the acid is absorbed by the fixed alkali or chalk; and the volatile alkali is of course set at liberty.

The volatile alkali is, however, in its mild state, being

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being combined with the fixed air, or discharged from the fixed alkali or chalk on their uniting with the muriatic acid.

The fixed alkali begins to act on the sal ammoniac, and extricates a pungent urinous odour as soon as they are mixed. Hence it is most convenient not to mix them till put into the distilling vessel. The two salts may be dissolved separately in water, the solutions poured into a retort, and a receiver immediately fitted on. An equal weight of the fixed salt is fully, perhaps more than sufficient to extricate all the volatile.

Chalk does not begin to act on the sal ammoniac till a considerable heat be applied. Hence they may be without inconvenience, and indeed ought to be thoroughly mixed together before they are put into the retort. The surface of the mixture may be covered with a little more powdered chalk, to prevent such particles of the sal ammoniac as may happen to lie uppermost from subliming unchanged. Though the fire must here be much greater than when fixed alkaline salt is used, it must not be strong, nor suddenly raised; for if it be, a part of the chalk (though of itself not capable of being elevated by any degree of heat) will be carried up along with the volatile salt. M. du Hamel experienced the justness of this observation. He relates, in the Memoirs of the French Academy of Sciences for the year 1735, that he frequently found his volatile salt, when a very strong fire was used in the sublimation, amount to more, sometimes by a half, than the weight of the crude sal ammoniac employed; and although not three-fourths of this concrete are pure volatile salt, yet the fixed earthy matter, when once volatilized by the alkali, arose along with it again on the gentlest resublimation, dissolved with it in water, and exhaled with it in the air.

When all the salt has sublimed, and the receiver grown cool, it may be taken off, and luted to another retort charged with fresh materials. This process may be repeated till the recipient appears lined with volatile salt to a considerable thickness: the vessel must then be broken in order to get out the salt.

The volatile salt and spirit of sal ammoniac are the purest of all the medicines of this kind. They are somewhat more acrimonious than those produced directly from animal substances, which always contain a portion of the oil of the subject, and receive from thence some degree of a saponaceous quality. These last may be reduced to the same degree of purity by combining them with acids into ammoniacal salts, and afterwards recovering the volatile alkali from these compounds by the processes above directed.

The matter which remains in the retort after the distillation of the spirit, and sublimation of the volatile sal ammoniac, is found to consist of marine acid united with the fixed alkali or chalk employed. When fixed alkaline salt has been used as the intermedium, the residuum, or *caput mortuum* as it is called, yields, on solution and crystallization, a salt exactly similar to the spirit of sea salt coagulated afterwards described; and hence we may judge of the extraordinary virtues formerly attributed to this salt under the names of *sal antihystericum*, *antihypochondriacum*, *febrifugum*, *digesticum Sylvii*, &c.

The *caput mortuum* of the volatile salt, where chalk is employed as an intermedium, exposed to a moist air,

runs into a pungent liquor, which proves nearly the same with a solution of chalk made directly in the marine acid. It is called by some *oleum cretæ*, oil of chalk. If calcined shells, or other animal limes, be mingled with sal ammoniac, a mass will be obtained, which likewise deliquesces in the air, and forms a liquor of the same kind.

Water of pure ammonia. L.

Take of sal ammoniac, one pound; quicklime, two pounds; water, one gallon. Add to the lime two pints of the water. Let them stand together an hour: then add the sal ammoniac and the other six pints of water boiling, and immediately cover the vessel. Pour out the liquor when cold, and distil off with a slow fire one pint. 225

Caustic volatile alkali, commonly called spirit of sal ammoniac with quicklime. E.

Take of quicklime, fresh burnt, two pounds; water, one pound. Having put the water into an iron or stone-ware vessel, add the quicklime previously beat; cover the vessel for 24 hours; when the lime has fallen into a fine powder, put it into the retort; then add 16 ounces of sal ammoniac, diluted with four times its weight of water; and, shutting the mouth of the retort, mix them together by agitation. Lastly, distil into a refrigerated receiver, with a very gentle heat, so that the operator can easily bear the heat of the retort applied to his hands. Twenty ounces of liquor are to be drawn off. In this distillation the vessels are to be so luted as thoroughly to exclude the vapours, which are very penetrating. After the distillation, however, they are to be opened, and the alkali poured out before the retort hath altogether cooled. 226

The theory of this process is precisely the same with that directed for the preparation of caustic ley. The effect of the quicklime on the sal ammoniac is very different from that of the chalk and fixed alkali in the foregoing process. Immediately on mixture a very penetrating vapour exhales; and in distillation the whole of the volatile salt arises in a liquid form, no part of it appearing in a concrete state, how gently so ever the liquor be re-distilled. This spirit is far more pungent than the other both in smell and taste; and, like fixed alkalis rendered caustic by the same intermedium, it raises no effervescence on mixture with acids. The whole of the phenomena are to be ascribed to the absorption of fixed air from the alkali by means of the quicklime; and from being thus deprived of the aerial acid the volatile alkali is brought to a caustic state.

This spirit is held to be too acrimonious for internal use, and has therefore been chiefly employed for smelling to in faintings, &c. though, when properly diluted, it may be given inwardly with safety. It is a powerful menstruum for some vegetable substances, as Peruvian bark, from which the other spirits extract little. It is also most convenient for the purpose of rendering oils miscible with water, as in the preparation of what is called in extemporaneous practice the oily mixture.

Some have mixed a quantity of this with the official spirits both of sal ammoniac and of hartshorn; which thus become more pungent, so as to bear an addition.

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addition of a considerable quantity of water, without any danger of the discovery from the taste or smell. This abuse would be prevented, if what has been formerly laid down as a mark of the strength of these spirits (some of the volatile salt remaining undissolved in them) were attended to. It may be detected by adding to a little of the suspected spirit about one-fourth its quantity or more of rectified spirit of wine; which, if the volatile spirit be genuine, will precipitate a part of its volatile salt, but occasions no visible separation or change in the caustic spirit, or in those which are sophisticated with it.

Others have substituted for the spirit of sal ammoniac a solution of crude sal ammoniac and fixed alkaline salt mixed together. This mixture deposites a saline matter on the addition of spirit of wine, like the genuine spirit; from which, however, it may be distinguished, by the salt which is thus separated not being a volatile alkaline, but a fixed neutral salt. The abuse may be more readily detected by a drop or two of solution of silver in aquafortis, which will produce no change in the appearance of the true spirit, but will render the counterfeit turbid and milky.

The volatile liquor, salt, and oil, of hartshorn. L.

- 227 Take of hartshorn, ten pounds. Distil with a fire gradually increased. A volatile liquor, salt, and oil, will ascend. The oil and salt being separated, distil the liquor three times. To the salt add an equal weight of prepared chalk, and sublime thrice, or till it become white.

The same volatile liquors, salt, and oil, may be obtained from any parts (except the fat) of all kinds of animals.

The volatile alkali obtained from hartshorn, whether in a solid or fluid state, is precisely the same with that obtained from sal ammoniac. And as that process is the easiest, the Edinburgh college have entirely rejected the present. While, however, the names of spirit and salt of hartshorn are still in daily use, ammonia, or the volatile alkali, is still prepared from bones and other animal substances by several very extensive traders.

The wholesale dealers have very large pots for the distillation of hartshorn, with earthen heads almost like those of the common still; for receivers, they use a couple of oil jars, the mouths of which are luted together; the pipe that comes from the head enters the lowermost jar through a hole made on purpose in its bottom. When a large quantity of the subject is to be distilled, it is customary to continue the operation for several days successively; only unluting the head occasionally to put in fresh materials.

When only a small quantity of spirit or salt is wanted, a common iron pot, such as is usually fixed in sand furnaces, may be employed, an iron head being fitted to it. The receiver ought to be large, and a glass, or rather tin adopter, inserted between it and the pipe of the head.

The distilling vessel being charged with pieces of the horn, a moderate fire is applied, which is slowly increased, and raised at length almost to the utmost degree. At first a watery liquor arises, the quantity of which will be smaller or greater according as the horns were more or less dry: this is succeeded by the salt and oil: the salt at first dissolves as it comes over in

the phlegm, and thus forms what is called *spirit*. When the phlegm is saturated, the remainder of the salt concretes in a solid form to the sides of the recipient. If it be required to have the whole of the salt solid and undissolved, the phlegm should be removed as soon as the salt begins to arise, which may be known by the appearance of white fumes; and that this may be done the more commodiously, the receiver should be left unluted till this first part of the process be finished. The white vapours which now arise sometimes come with such vehemence as to throw off or burst the receiver. To prevent this accident, it is convenient to have a small hole in the luting, which may be occasionally stopped with a wooden peg, or opened, as the operator shall find proper. After the salt has all arisen, a thick dark-coloured oil comes over. The process is now to be discontinued; and the vessels, when grown cold, unluted.

All the liquid matters being poured out of the receiver, the salt which remains adhering to its sides is to be washed out with a little water and added to the rest. It is convenient to let the whole stand for a few hours, that the oil may the better disengage itself from the liquor, so as to be first separated by a funnel, and afterwards more perfectly by filtration through wet paper. The salt and spirits are then to be farther purified as above directed.

The spirit of hartshorn met with in the shops is extremely precarious in point of strength; the quantity of salt contained in it (on which its efficacy depends) varying according as the distillation in rectifying it is continued for a longer or shorter time. If after the volatile salt has arisen, so much of the phlegm or watery part be driven over as is just sufficient to dissolve it, the spirit will be fully saturated, and as strong as it can be made. If the process be not at this instant stopped, the phlegm, continuing to arise, must render the spirit continually weaker and weaker. The distillation therefore ought to be discontinued at this period, or rather while some of the salt still remains undissolved; the spirit will thus prove always equal, and the buyer be furnished with a certain criterion of its strength. Very few have taken any notice of the above-mentioned inconvenience of these kinds of spirits; and the remedy is first hinted at in the *Pharmacopœia Reformata*. The purity of the spirit is easily determined from its clearness and grateful odour.

Volatile alkaline salts, and their solutions called *spirits*, agree in many respects with fixed alkalis, and their solutions or leys: as in changing the colour of blue flowers to a green; effervescing, when in their mild state, with and neutralizing acids; liquefying the animal juices; and corroding the fleshy parts, so as, when applied to the skin, and prevented from exhaling by a proper covering, to act as caustics; dissolving oils and sulphur, though less readily than the fixed alkalis, on account probably of their not being able to bear any considerable heat, by which their activity might be promoted. Their principal difference from the other alkalis seems to consist in their volatility. They exhale or emit pungent vapours in the coldest state of the atmosphere; and by their stimulating smell they prove serviceable in languors and faintings. Taken internally, they discover a greater colliquating as well as stimulating power; the blood drawn from a vein,

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vein, after their use has been continued for some time, is said to be remarkably more fluid than before; they are likewise more disposed to operate by perspiration, and to act on the nervous system. They are particularly useful in lethargic cases; in hysterical and hypochondriacal disorders; and in the languors, headaches, inflations of the stomach, flatulent colics, and other symptoms which attend them. They are generally found more serviceable to aged persons, and in phlegmatic habits, than in the opposite circumstances. In some fevers, particularly those of the low kind, accompanied with a cough, hoarseness, and a redundancy of phlegm, they are of great utility, raising the *vis vite*, and exciting a salutary diaphoresis; but in putrid fevers, scurvies, and wherever the mass of blood is thin and acrimonious, their use is ambiguous. As they are more powerful than the fixed in liquefying tenacious humours, so they prove more hurtful where the fluids are already in a colliquated state. In vernal intermittents, particularly those of the slow kind, they are often the most efficacious remedy. Dr Bisset observes, in his Essay on the Medical Constitution of Great Britain, that though many cases occur which will yield to no other medicine than the bark, yet he has met with many which were only suppressed from time to time by the bark, but were completely cured by alkaline spirits. He tells us, that these spirits will often carry off vernal intermittents without any previous evacuation: but that they are generally more effectual if a purge be premised; and in plethoric or inflammatory cases, or where the fever personates a remittent, venesection is necessary.

These salts are most commodiously taken in a liquid form, largely diluted; or in that of a bolus, which should be made up only as it is wanted. The dose is from a grain or two to ten or twelve. Ten drops of a well made spirit, or saturated solution, are reckoned to contain about a grain of the salt. In intermittents, 15 or 20 drops of the spirit are given in a tea-cupful of cold spring water, and repeated five or six times in each intermission.

The volatile salts and spirits prepared from different animal substances, have been supposed capable of producing different effects on the human body, and to receive specific virtues from the subject. The salt of vipers has been esteemed particularly serviceable in disorders occasioned by the bite of that animal; and a salt drawn from the human skull, in diseases of the head. But modern practice acknowledges no such different effects from these preparations; and chemical experiments have shown their identity. There is indeed, when not sufficiently purified, a very perceptible difference in the smell, taste, degree of pungency, and volatility of these salts; and in this state their medicinal virtues vary considerably enough to deserve notice: but this difference they have in common, according as they are more or less loaded with oil, not as they are produced from this or that animal substance. As first distilled, they may be looked on as a kind of volatile soap, in which the oil is the prevailing principle; in this state they have much less of the proper alkaline acrimony and pungency than when they have undergone repeated distillations, and such other operations as disengage the oil from the salt; for by these means they lose their saponaceous quality,

and acquiring greater degrees of acrimony, become medicines of a different class. These preparations therefore do not differ near so much from each other, as they do from themselves in different states of purity. To which may be added, that when we consider them as loaded with oil, the virtues of a distilled animal oil itself are likewise to be brought into the account.

These oils, as first distilled, are highly fetid and offensive, of an extremely heating quality, and of such activity, that, according to Hoffman's account, half a drop dissolved in a dram of spirit of wine is sufficient to raise a copious sweat. By repeated rectifications, they lose their offensiveness, and at the same time become mild in their medicinal operation. The rectified oils may be given to the quantity of twenty or thirty drops, and are said to be anodyne and antispasmodic, to procure a calm sleep and gentle sweat, without heating or agitating the body, as has been observed in treating of the animal oil. It is obvious, therefore, that the salts and spirits must differ, not only according to the quantity of oil they contain, but according to the quality of the oil itself in its different states.

The volatile salt and spirits, as first distilled, are of a brown colour, and a very offensive smell: by repeated rectification, as directed in the processes above set down, they lose great part of the oil on which these qualities depend, the salt becomes white, the spirit limpid as water, and of a grateful odour; and this is the mark of sufficient rectification.

It has been objected to the repeated rectification of these preparations, that, by separating the oil, it renders them similar to the pure salt and spirit of sal ammoniac, which are procurable at an easier rate. But the intention is not to purify them wholly from the oil, but to separate the grosser part, and to subtilize the rest, so as to bring it towards the same state as when the oil is rectified by itself. The rectification of spirit of hartshorn has been repeated twenty times successively, and found still to participate of oil, but of an oil very different from what it was in the first distillation.

The rectified oils, in long-keeping, become again fetid. The salts and spirits also, however carefully rectified, suffer in length of time the same change; resuming their original brown colour and ill smell; a proof that the rectification is far from having divested them of oil. Any intentions, however, which they are thus capable of answering, may be as effectually accomplished by a mixture of the volatile alkali with the animal oil, in its rectified state, to any extent that may be thought necessary.

Vitriolated kali. I.

Take of the salt which remains after the distillation of the nitrous acid, two pounds. Distilled water, two gallons. Burn out the superfluous acid with a strong fire in an open vessel; then boil it a little while in the water; strain and set the liquor aside to crystallize.

The salt thus formed is the same with the vitriolated tartar of the last edition of the London pharmacopœia; but it is now prepared in a cheaper and easier manner, at least for those who distil the nitrous acid. In both ways a neutral is formed, consisting of the fixed ve-

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table alkali, united to the vitriolic acid. But a similar compound may also be obtained by the following process of the Edinburgh pharmacopœia.

Vitriolated fixed vegetable alkali, commonly called *vitriolated tartar*. E.

- 229 Take of vitriolic acid, diluted with six times its weight of water, as much as you please. Put it into a capacious glass vessel, and gradually drop into it, of purified fixed vegetable alkali, diluted with six times its weight of water, as much as is sufficient thoroughly to neutralize the acid. The effervescence being finished, strain the liquor through paper; and after proper evaporation, set it aside to crystallize.

The operator ought to take care that the vapour separated during the effervescence shall not be applied to his nostrils; as fixed air, when applied to the olfactory nerves, is highly deleterious to life.

This is an elegant and one of the least troublesome ways of preparing this salt. The Edinburgh college, in their former editions, ordered the acid liquor to be dropped into the alkaline: by the converse procedure now received, it is obviously more easy to secure against a redundancy of acidity; and for the greater certainty in this point, it may be expedient, as in the foregoing process, to drop in a little more of the alkaline ley than the cessation of the effervescence seems to require.

In a former edition of the same pharmacopœia, the acid was directed to be diluted only with its equal weight of water, and the alkali with that quantity of water which it is capable of imbibing from the atmosphere. By that imperfection there was not water enough to keep the vitriolated tartar dissolved; on which account, as fast as the alkali was neutralized by the acid, a great part fell to the bottom in a powdery form. In order to obtain perfect and well formed crystals, the liquor should not be set in the cold, but continued in moderate heat, such as the hand can scarcely bear, that the water may slowly evaporate.

It is remarkable, that although the vitriolic acid and fixed alkaline salt do each readily unite with water, and strongly attract moisture, even from the air, yet the neutral resulting from the combination of these two, vitriolated tartar, is one of the salts most difficult of solution, very little of it being taken up by cold water.

Vitriolated tartar, in small doses, as a scruple or half a dram, is an useful aperient; in large ones, as four or five drams, a mild cathartic, which does not pass off so hastily as the bitter cathartic sal or salt of Glauber, and seems to extend its action further. The wholesale dealers in medicines have commonly substituted for it an article otherwise almost useless in their shops, the residuum of Glauber's spirit of nitre. This may be looked on as a venial fraud, if the spirit has been prepared as formerly directed, and the residuum dissolved and crystallized: but it is a very dangerous one if the vitriolic acid has been used in an over proportion, and the caput mortuum employed without crystallization; the salt in this case, instead of a mild neutral one, of a moderately bitter taste, proving highly acid. The purchaser ought therefore to insist on the salt being in

a crystalline form. The crystals when perfect are oblong, with six flat sides, and terminated at each end by a six-sided pyramid: some appear composed of two pyramids joined together by the bases; and many, in the most perfect crystallizations we have seen, are very irregular. They decrepitate in the fire, somewhat like those of sea-salt, for which they have sometimes been mistaken.

Salt of many virtues. E.

Take nitre in powder, flowers of sulphur, of each equal parts. Mix them well together, and inject the mixture by little and little at a time into a red-hot crucible: the deflagration being over, let the salt cool, after which it is to be put up in a glass vessel well shut. The salt may be purified by dissolving it in warm water, filtering the solution, and exhaling it to dryness, or by crystallization.

This is another method of uniting the vitriolic acid with the common vegetable fixed alkali. Both the nitre and the sulphur are decomposed in the operation: the acid of the nitre, and the inflammable principle of the sulphur, detonate together, and are dissipated; while the acid of the sulphur (which, as we have already seen, is no other than the vitriolic acid) remains combined with the alkaline basis of the nitre. The shops accordingly have substituted the foregoing preparation for the sal pochyrest.

Vitriolated natron. L.

Take of the salt which remains after the distillation of the muriatic acid, two pounds; distilled water, two pints and an half. Burn out the superfluous acid with a strong fire in an open vessel; then boil it for a little in the water: strain the solution, and set it by to crystallize.

Vitriolated soda, commonly called *cathartic salt of Glauber*. E.

Dissolve in warm water the mass which remains after the distillation of spirit of sea-salt: filter the solution, and crystallize the salt.

The directions given for the preparation of this salt, long known by the name of *sal mirabile Glauberi*, are nearly the same in the pharmacopœias of both colleges; but those of the London college are to be preferred, as being most accurate and explicit.

In a former edition of the Edinburgh pharmacopœia, it was ordered, that if the crystals (obtained as above) proved too sharp, they should be again dissolved in water, and the filtered liquor evaporated to such a pitch only as may dispose the salt to crystallize. But there is no great danger of the crystals proving too sharp, even when the spirit of salt is made with the largest proportion of oil of vitriol directed under that process. The liquor which remains after the crystallization is indeed very acid; and with regard to this preparation, it is convenient it should be so; for otherwise the crystals will be very small, and likewise in a small quantity. Where a sufficient proportion of oil of vitriol has not been employed in the distillation of the spirit, it is necessary to add some to the liquor, in order to promote the crystallization of the salt.

The title of *cathartic salt*, which this salt has often had, expresses its medical virtues. Taken from half

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an ounce to an ounce, or more, it proves a mild and useful purgative; and in smaller doses, largely diluted, a serviceable aperient and diuretic. The shops frequently substitute for it the bitter cathartic salt, which is nearly of the same quality, but somewhat more unpleasant, and, as is said, less mild in operation. They are very easily distinguishable from each other, by the effect of alkaline salts upon solutions of them. The solutions of Glauber's salt suffer no visible change from this addition, its own basis being a true fixed alkali: but the solution of the bitter cathartic salt grows instantly white and turbid; its basis, which is an earth, being extricated copiously by the alkaline salt.

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Purified nitre. L.

Take of nitre two pounds; distilled water, four pints. Boil the nitre in the water till it be dissolved; strain the solution, and set it aside to crystallize.

Common nitre contains usually a considerable portion of sea-salt, which in this process is separated, the sea-salt remaining dissolved after the greatest part of the nitre has crystallized. The crystals which shoot after the first evaporation are large, regular, and pure: but when the remaining liquor is further evaporated, and this repeated a second or third time, the crystals prove at length small, imperfect, and tipped with little cubical crystals of sea-salt.

When rough nitre, in the state wherein it is first extracted from the earths impregnated with it, is treated in this manner, there remains at last a liquor, called *mother-ley*, which will no longer afford any crystals. This appears to participate of the nitrous and marine acids, and to contain an earthy matter dissolved by those acids. On adding alkaline lixivium, the earth is precipitated; and when thoroughly washed with water, proves insipid. If the liquor be evaporated to dryness, a bitterish saline matter is left; which being strongly calcined in a crucible, parts with the acids, and becomes, as in the other case, insipid.

This earth has been celebrated as an excellent purgative, in the dose of a dram or two; and, in smaller doses, as an alterant in hypochondriacal and other disorders. This medicine was for some time kept a great secret, under the name of *magnesia alba*, *nitrous panacea*, *Count Palma's powder*, *il polvere albo Romano*, *poudre de Sentinelli*, &c. till Lancisi made it public in his notes on the *Metallototeca Vaticana*. It has been supposed, that this earth is no other than a portion of the lime commonly added in the elixation of nitre at the European nitre-works: but though the specimens of magnesia examined by Neumann, and some of that which has lately been brought hither from abroad, gave plain marks of a calcareous nature; yet the true magnesia must be an earth of a different kind, calcareous earths being rather astringent than purgative. The earthy basis of the bitter cathartic salt is found to have the properties ascribed to the true magnesia of nitre, and appears to be the very same species of earth: from that salt therefore this medicine is now prepared, as will be seen hereafter. The magnesia alba differs from calcareous earths, in having a less powerful attraction for fixed air, and in not becoming caustic by calcination.

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Acetated kali. L.Prepara-
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Take of kali one pound; boil it with a slow fire in four or five times its quantity of distilled vinegar; the effervescence ceasing, let there be added at different times more distilled vinegar, until the last vinegar being nearly evaporated, the addition of fresh will excite no effervescence, which will happen when about twenty pounds of distilled vinegar are consumed; afterwards let it be dried slowly. An impure salt will be left, which melt for a little while with a slow fire; then let it be dissolved in water, and filtered through paper. If the fusion has been rightly performed, the strained liquor will be colourless; if otherwise, of a brown colour. Lastly, evaporate this liquor with a slow fire, in a very shallow glass vessel; frequently stirring the mass, that the salt may be more completely dried, which should be kept in a vessel close stopped. The salt ought to be very white, and dissolve wholly, both in water and spirit of wine, without leaving any feces. If the salt, although white, should deposit any feces in spirit of wine, that solution in the spirit should be filtered through paper, and the salt again dried.

Acetated fixed vegetable alkali, commonly called regenerated tartar. E.

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Take of salt of tartar one pound; boil it with a very gentle heat in four or five times its quantity of distilled vinegar; add more distilled vinegar at different times, till on the watery part of the former quantity being nearly dissipated by evaporation, the new addition of vinegar ceases to raise any effervescence. This happens when about twenty pounds by weight of distilled vinegar has been consumed. The impure salt remaining after the exsiccation, is to be liquefied with a gentle heat for a short time, and it is proper that it should only be for a short time; then dissolve it in water, and strain through paper. If the liquefaction has been properly performed, the strained liquor will be limpid; but if otherwise, of a brown colour. Evaporate this liquor with a very gentle heat in a shallow glass vessel, occasionally stirring the salt as it becomes dry, that its moisture may sooner be dissipated. Then put it up into a vessel very closely stopped, to prevent it from liquefying in the air.

This salt had formerly the name of *diuretic salt* in the London pharmacopœia; but that which they now employ, or perhaps in preference to it, the name of *potassa acetata*, gives a clearer idea of its nature.

The purification of this salt is not a little troublesome. The operator must be particularly careful, in melting it, not to use a great heat, or to keep it long liquefied: a little should be occasionally taken out, and put into water; and as soon as it begins to part freely with its black colour, the whole is to be removed from the fire. In the last drying, the heat must not be so great as to melt it; otherwise it will not prove totally soluble. If the solution in spirit of wine be exsiccated, and the remaining salt liquefied with a very gentle fire, it gains the leafy appearance which has procured it the name *terra foliata*.

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In the fourth volume of the Memoirs of the correspondents of the French Academy, lately published, Mr Cadet has given a method of making the salt white at the first evaporation, without the trouble of any farther purification. He observes, that the brown colour depends on the oily matter of the vinegar being burnt by the heat commonly employed in the evaporation; and his improvement consists in diminishing the heat at the time that this burning is liable to happen. The process he recommends is as follows:

Dissolve a pound of salt of tartar in a sufficient quantity of cold water; filter the solution, and add by degrees as much distilled vinegar as will saturate it, or a little more. Set the liquor to evaporate in a stone-ware vessel in a gentle heat, not so strong as to make it boil. When a pellicle appears on the surface, the rest of the process must be finished in a water-bath. The liquor acquires by degrees an oily consistence, and a pretty deep brown colour; but the pellicle or scum on the top looks whitish, and when taken off and cooled, appears a congeries of little brilliant silver-like plates. The matter is to be kept continually stirring, till it be wholly changed into this white flaky matter; the complete drying of which is most conveniently effected in a warm oven.

We shall not take upon us to determine whether the pure or impure salt is preferable as a medicine; observing only, that the latter is more of a saponaceous nature, the former more acrid, though somewhat more agreeable to the stomach. Mr Cadet reckons the salt prepared in his method superior both to the brown and white sorts made in the common way, as possessing both the oily quality of the one and the agreeableness of the other, and as being always uniform or of the same power: whereas the others are liable to vary considerably, according to the degree of heat employed in the evaporation. They are all medicines of great efficacy, and may be so dosed and managed as to prove either mildly cathartic, or powerfully diuretic: few of the saline deobstruents come up to them in virtue. The dose is from half a scruple to a dram or two. A bare mixture, however, of alkaline salt and vinegar, without exsiccation, is not perhaps much inferior as a medicine to the more elaborate salt. Two drams of the alkali, saturated with vinegar, have been known to occasion ten or twelve stools in hydroptic cases, and a plentiful discharge of urine, without any inconvenience.

Water of acetated ammonia. L.

- 236 Take of ammonia, by weight, two ounces; distilled vinegar, four pints; or as much as is sufficient to saturate the ammonia. Mix.

Spirits of Mindererus. E.

- 237 Take any quantity of the volatile alkaline salt of sal ammoniac, and gradually pour upon it distilled vinegar till the effervescence ceases; occasionally stirring the mixture to promote the action of the vinegar on the salt.

Though this article has long been known by the name of Spiritus Mindereri, so called from the inventor; yet that employed by the London college is undoubtedly preferable, as giving a proper idea of its constituent parts.

This is an excellent aperient saline liquor. Taken warm in bed, it proves commonly a powerful diaphoretic or sudorific; and as it operates without heat, it has place in febrile and inflammatory disorders, where medicines of the warm kind, if they fail of procuring sweat, aggravate the distemper. Its action may likewise be determined to the kidneys, by walking about in a cool air. The common dose is half an ounce, either by itself, or along with other medicines adapted to the intention. Its strength is not a little precarious, depending much on that of the vinegar; an inconvenience which cannot easily be obviated, for the saline matter is not reducible to the form of a concrete salt.

Tartarized kali. L.

Take of kali one pound; crystals of tartar, three pounds; distilled water, boiling, one gallon. To the salt, dissolved in water, throw in gradually the crystals of tartar, powdered: filter the liquor, when cold, through paper: and, after due evaporation, set it apart to crystallize.

Tartarized vegetable fixed alkali, commonly called soluble tartar. E.

Take of purified fixed vegetable alkaline salt one pound; water, 15 pounds. To the salt dissolved in the boiling water gradually add crystals of tartar in fine powder, as long as the addition thereof raises any effervescence, which almost ceases before three times the weight of the alkaline salt hath been injected; then strain the cooled liquor through paper, and after due evaporation set it aside to crystallize.

Common white tartar is perhaps preferable for this operation to the crystals usually met with. Its impurities can here be no objection; since it will be sufficiently depurated by the subsequent filtration.

The preparation of this medicine by either of the above methods is very easy; though some chemists have rendered it sufficiently troublesome, by a nicety which is not at all wanted. They insist upon hitting the very exact point of saturation between the alkaline salt and the acid of the tartar; and caution the operator to be extremely careful, when he comes near this mark, lest by imprudently adding too large a portion of either, he render the salt too acid or too alkaline. If the liquor be suffered to cool a little before it be committed to the filter, and then properly exhaled and crystallized, no error of this kind can happen, though the saturation should not be very exactly hit: for since crystals of tartar are very difficultly soluble even in boiling water, and when dissolved therein concrete again upon the liquor's growing cold, if any more of them has been employed than is taken up by the alkali, this superfluous quantity will be left upon the filter; and, on the other hand, when too much of the alkali has been used, it will remain uncrySTALLIZED. The crystallization of this salt indeed cannot be effected without a good deal of trouble: it is therefore most convenient to let the acid salt prevail at first; to separate the superfluous quantity, by suffering the liquor to cool a little before filtration; and then proceed to the total evaporation of the aqueous fluid, which will leave behind it the neutral salt required. The most proper vessel for this purpose is a stone-ware one; iron discolours the salt.

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Soluble tartar, in doses of a scruple, half a dram, or a dram, is a mild cooling aperient; two or three drams commonly loosen the belly; and an ounce proves pretty strongly purgative. It has been particularly recommended as a purgative for maniacal and melancholic patients. Malouin says, it is equal in purgative virtue to the cathartic salt of Glauber. It is an useful addition to the purgatives of the resinous kind, as it promotes their operation, and at the same time tends to correct their griping quality. But it must never be given in conjunction with any acid; for all acids decompose it, absorbing its alkaline salt, and precipitating the tartar. On this account it is improper to join it to tamarinds, or such like acid fruits; which is too often done in the extemporaneous practice of those physicians who are fond of mixing different cathartics together.

Tartarized natron. L.

- 240 Take of natron, 20 ounces; crystals of tartar, powdered, 2 pounds; distilled water, boiling, 10 pints. Dissolve the natron in the water, and gradually add the crystals of tartar: filter the liquor through paper; evaporate, and set it aside to crystallize.

Tartarized soda, commonly called Rochel salt. E.

- 241 The Rochel salt may be prepared from purified fossil alkaline salt and crystals of tartar, in the same manner as directed for the soluble tartar.

This is a species of soluble tartar, made with the salt of kali or soda, which is the same with the mineral alkali, or basis of sea-salt. It crystallizes far more easily than the preceding preparation, and does not, like it, grow moist in the air. It is also considerably less purgative, but is equally decomposed by acids. It appears to be a very elegant salt, and begins now to come into esteem in this country, as it has long been in France.

Purification of alum. L.

- 242 Take of alum, one pound; chalk, one dram by weight; distilled water, one pint. Boil them a little, strain, and set the liquor aside to crystallize.

We have already offered some observations on alum (see ALUM); and in general we may say that it comes from the alum works in England in a state of such purity as to be fit for every purpose in medicine: accordingly we do not observe that the purification of alum has a place in any other pharmacopœias; but by the present process it will be freed, not only from different impurities, but also from superabundant acid.

Burnt alum. L. E.

- 243 Take of alum, half a pound. Burn it in an earthen vessel so long as it bubbles.

This, with strict propriety, ought rather perhaps to be called dried alum than burnt alum; for the only effect of the burning here directed is to expel the water. In this state it is so acrid as to be frequently employed as an escharotic; and it is with this intention chiefly that it has a place in our pharmacopœias: but it has sometimes also been taken internally, particularly in cases of cholic.

Salt or sugar of milk. Suec.

- 244 Take of the whey of milk, prepared by runnet, any

quantity: let it be boiled over a moderate fire to the consistence of a syrup; then put it in a cold place, that crystals may be formed. Let the fluid which remains be again managed in the same manner, and let the crystals formed be washed with cold water.

It has been by some imagined, that the superiority of one milk over another depends on its containing a larger proportion of this saline or saccharine part; and particularly, that upon this the reputed virtues of ass milk depend. Hence this preparation has been greatly celebrated in disorders of the breast, but it is far from answering what has been expected from it. It has little sweetness, and is difficult of solution in water. A saline substance, much better deserving the name of sugar, may be obtained by evaporating new milk, particularly that of the ass, to dryness, digesting the dry matter in water till the water has extracted its soluble parts, and then inspissating the filtered liquor. This preparation is of great sweetness, though neither white nor crystalline; nor is it perhaps in the pure crystallizable parts of milk that its medicinal virtues reside; and so little reliance is put on it as a medicine, that it has no place in the London or Edinburgh pharmacopœias; although it long has stood, and still stands, in the foreign ones.

Salt of sorrel. Suec.

Take any quantity of the expressed juice of the leaves of wood sorrel; let it boil gently, that the feculent matter may be separated; then strain it till it be clear, and after this boil it on a moderate fire to the consistence of a syrup. Put it into long-necked glass vessels, and place it in a cold situation that it may crystallize. Let these crystals be dissolved in water, and again formed into purer ones.

To make the sorrel yield its juice readily, it should be cut to pieces, and well bruised in a small mortar, before it be committed to the press. The magma which remains in the bag still retaining no inconsiderable quantity of saline matter, may be advantageously boiled in water, and the decoction added to the expressed juice. The whole may be afterwards depurated together, either by the method above directed, or by running the liquor several times through a linen cloth. In some cases the addition of a considerable portion of water is necessary, that the juice, thus diluted, may part the more freely with its feculencies; on the separation of which the success of the process much depends.

The evaporation should be performed either in shallow glass basins, or in such earthen ones as are of a compact close texture; such are those usually called *stone-ware*. The common earthen vessels are subject to have their glazing corroded, and are so extremely porous, as readily to imbibe and retain a good quantity of the liquor; metallic vessels are particularly apt to be corroded by these acid kinds of juices.

These juices are so viscid, and abound so much with heterogeneous matter, of a quite different nature from any thing saline, that a pellicle, or pure saline incrustation upon the surface, is in vain expected. Boerhaave, therefore, and the more expert writers in pharmaceutical chemistry, with great judgment direct the evaporation of the superfluous moisture to be continued

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until the matter has acquired the consistence of cream. If it be now suffered to stand for an hour or two in a warm place, it will, notwithstanding the former depurations, deposit a fresh sediment, from which it should be warily decanted before it be put into the vessel in which it is designed to be crystallized.

Some recommend an unglazed earthen vessel as preferable for this purpose to a glass one; the smoothness of the latter being supposed to hinder the salt from sticking thereto; while the juice easily insinuating itself into the pores of the former, has a great advantage of shooting its saline spicula to the sides. Others slightly incrustate the sides and bottom of whatever vessel they employ with a certain mineral salt, which greatly disposes the juice to crystallize, to which of itself it is very averse; but this addition is, with regard to its medical virtue, quite different from the salt here intended.

The liquor which remains after the crystallization may be depurated by a gentle colature, and after due inspissation set to shoot again; when a farther produce of crystals will be obtained.

The process for obtaining this salt is very tedious; and the quantity of salt which the juices afford is extremely small: hence they are hardly ever made or expected in the shops. They may be somewhat sooner separated from the mucilage and other feculencies, by clarification with whites of eggs, and by adding very pure white clay.

In the manner above described, salts may also be obtained from other acid, austere, and bitterish plants, which contain but a small quantity of oil.

The virtues of the essential salts have not been sufficiently determined from experience. This much, however, is certain, that they do not, as has been supposed, possess the virtues of the subjects entire, excepting only the acids and sweets. The others seem to be almost all of them nearly similar, whatever plant they were obtained from. In watery extracts of wormwood, carduus, camomile, and many other vegetables, kept for some time in a soft state, there may be observed fine saline efflorescences on the surface, which have all nearly the same taste, somewhat of the nitrous kind. They are supposed by some to be in reality no more than an impure species of volatile nitre (that is, a salt composed of the nitrous acid and volatile alkali): those which were examined by the chemists of the French academy deflagrated in the fire, and being triturated with fixed alkali, exhaled an urinous odour; plain marks of their containing those two ingredients.

Acid salt of borax. Suec.

- 246 Take of borax, an ounce and a half; warm spring-water, one pound. Mix them in a glass vessel, that the borax may be dissolved; then pour into it three drams of the concentrated acid of vitriol: evaporate the liquor till a pellicle appears upon it; after this let it remain at rest till the crystals be formed. Let them be washed with cold water, and kept for use.

This salt, which has long been known by the title of the *sedative salt of Homberg*, is not unfrequently formed by sublimation: but the process by crystallization here directed is less troublesome, though the salt proves generally less white, and is apt likewise to retain a

part of Glauber's salt, especially if the evaporation be long protracted.

The salt of borax to the taste appears to be a neutral; but when it is examined by alkalis, it shows the properties of an acid, effervescing, uniting, and crystallizing with them, and it destroys their alkaline quality. It dissolves both in water and spirit of wine, although not very readily in either.

The virtues attributed to it may in some degree be inferred from the name of *sedative*, by which it was long distinguished. It has been supposed to be a mild anodyne, to diminish febrile heat, to prevent or remove delirium, and to allay, at least for some time, spasmodical affections, particularly those which are the attendants of hypochondriasis and hysteria. It may be given in doses from two to twenty grains.

Purified sal ammoniac. Suec.

Dissolve sal ammoniac in spring-water; strain the liquor through paper; evaporate it to dryness in a glass vessel by means of a moderate fire.

The sal ammoniac imported from the Mediterranean often contains such impurities as to render the above process necessary; but that which is prepared in Britain from foot and sea-salt, is in general brought to market in a state of very great purity. Hence this process is now altogether omitted both in the London and Edinburgh pharmacopœias. It furnishes, however, when necessary, an easy and effectual mode of obtaining a pure ammonia muriata.

CHAP. VIII. *Magnesia.*

White magnesia.

Take of bitter purging salt, kali, each two pounds; distilled water, boiling, 20 pints. Dissolve the bitter salt and the kali separately in 10 pints of water, and filter through paper; then mix them. Boil the liquor a little while, and strain it while hot through linen, upon which will remain the white magnesia; then wash away, by repeated affusions of distilled water, the vitriolated kali. *L.*

Take of bitter purging salt, purified fixed vegetable alkali, equal weights. Dissolve them separately in double their quantity of warm water, and let the liquor be strained or otherwise freed from the feces; then mix them, and instantly add eight times their quantity of warm water. Let the liquor boil a little, stirring it very well at the same time; then let it rest till the heat be somewhat diminished; after which strain it through a cloth: the magnesia will remain upon the cloth, and it is to be washed with pure water till it be altogether void of saline taste. *E.*

The processes here directed by the London and Edinburgh colleges are nearly the same; but the former seem to have improved somewhat on the latter, both in simplifying the process, and in the employment of distilled water.

The *bitter cathartic salt*, or *Epsom salt*, is a combination of the vitriolic acid and magnesia. In this process, then, a double elective attraction takes place: the vitriolic

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vitriolic acid forsakes the magnesia, and joins the mild alkali, for which it has a greater attraction; while the magnesia in its turn unites with the fixed air discharged from the mild alkali, and ready to be absorbed by any substance with which it can combine.

We have therefore two new products, viz. a vitriolated tartar, and magnesia united with fixed air. The former is dissolved in the water, and may be preserved for use; the latter, as being much less soluble, sinks to the bottom of the vessel. The intention of employing such a large quantity of water and of the boiling is, that the vitriolated tartar may be all thoroughly dissolved; this salt being so scarcely soluble in water, that without this expedient a part of it might be precipitated along with the magnesia. It might perhaps be more convenient to employ the mineral alkali; which forming a Glauber's salt with the vitriolic acid, would require less water for its suspension. By the after ablutions, however, the magnesia is sufficiently freed from any portion of vitriolated tartar which may have adhered to it.

The ablutions should be made with very pure water; for nicer purposes distilled water may be used with advantage; and soft water is in every case necessary. Hard water for this process is peculiarly inadmissible, as the principle in waters giving the property called *hardness* is generally owing to an imperfect nitrous selenite, whose base is capable of being disengaged by magnesia united with fixed air. For though the attraction of magnesia itself to the nitrous acid is not greater than that of calcareous earths; yet when combined with fixed air, a peculiar circumstance intervenes; whence it is deducible, that the sum of the forces tending to join the calcareous earth with the air of the magnesia, and the magnesia with the acid, is greater than the sum of the forces tending to join the calcareous earth with the acid, and the magnesia with the fixed air.

This phenomenon must therefore depend on the presence of fixed air, and its greater attraction for lime than for magnesia. On this account, if hard water be used, a quantity of calcareous earth must infallibly be deposited on the magnesia; while the nitrous acid with which it was combined in the water, will in its turn attach itself to a portion of the magnesia, forming what may be called a *nitrous magnesia*.

All the alkalis, and also calcareous earths, have a greater attraction for fixed air than magnesia has: Hence, if this last be precipitated from its solution in acids by caustic alkali, it is then procured free from fixed air: but for this purpose calcination is more generally employed in the manner described in the process which next follows. Magnesia is scarcely at all soluble in water: the infinitely small portion which this fluid is capable of taking up, is owing to the fixed air of the magnesia; and it has been lately discovered, that water impregnated with this acid is capable of dissolving a considerable portion: for this purpose it is necessary to employ magnesia already saturated with fixed air, as magnesia deprived of this air would quickly abstract it from the water, whereby the force of the latter would be very considerably diminished. Such a solution of magnesia might be useful for several purposes in medicine.

Magnesia is the same species of earth with that obtained from the mother-ley of nitre, which was for several years a celebrated secret in the hands of some particular persons abroad. Hoffman, who describes the preparations of the nitrous magnesia, gives it the character of an useful antacid, a safe and inoffensive laxative in doses of a dram or two, and a diaphoretic and diuretic when given in smaller doses of 15 or 20 grains. Since his time, it has had a considerable place in the practice of foreign physicians; and is now in great esteem among us, particularly in heart-burns, and for preventing or removing the many disorders which children are so frequently thrown into from a redundancy of acid humours in the first passages: it is preferred, on account of its laxative quality, to the common absorbents, which, unless gentle purgatives be occasionally given to carry them off, are apt to lodge in the body, and occasion a costiveness very detrimental to infants.

Magnesia alba, when prepared in perfection, is a white and very subtile earth, perfectly void of smell or taste, of the class of those which dissolve in acids. It dissolves freely even in the vitriolic acid; which, in the common way of making solutions, takes up only an inconsiderable portion of other earths. Combined with this acid, it forms the bitter purging or Epsom salt, very easily soluble in water; while the common absorbents form with the same acid almost insipid concretes, very difficult of solution. Solutions of magnesia in all acids are bitter and purgative, while those of the other earths are more or less austere and astringent. A large dose of magnesia, if the stomach contain no acid to dissolve it, does not purge or produce any sensible effect; a moderate one, if an acid be lodged there, or if acid liquors be taken after it, procures several stools; whereas the common absorbents, in the same circumstances, instead of loosening, bind the belly. It is obvious, therefore, that magnesia is specifically different from the other earths, and that it is applicable to several useful purposes in medicine.

Magnesia was formerly made with the mother-water of nitre evaporated to dryness, or precipitated by a fixed alkali. It has gone under different names, as the *white powder of the Count of Palma*, *powder of sentinelle*, *polychrest*, *laxative powder*, &c. It seems to have got the character *white*, to distinguish it from the dark-coloured mineral called also *magnesia* or *manganese*; a substance possessing very different properties. We have not heard that pure native magnesia has been found in its uncombined state. A combination of it with sulphur has been discovered to cover a stratum of coal at Littry in Lower Normandy. It has also been found in certain serpentine earths in Saxony, and in marly and alum earths.

Calcined magnesia.

Take of white magnesia, four ounces. Expose it to a strong heat for two hours; and, when cold, set it by. Keep it in a vessel closely stopped. *L.*
Let magnesia, put into a crucible, be continued in a red heat for two hours; then put it up in close glass vessels. *E.*

By this process the magnesia is freed of fixed air; which, according to Dr Black's experiments, constitutes

tutes about $\frac{1}{10}$ ths of its weight. A kind of opaque foggy vapour is observed to escape during the calcination, which is nothing else than a quantity of fine particles of magnesia buoyed off along with a stream of the disengaged air. About the end of the operation, the magnesia exhibits a kind of luminous or phosphorescent property; and this may be considered as a pretty exact criterion of its being deprived of air.

Calcined magnesia is equally mild as when saturated with fixed air; and this circumstance is sufficient to establish a difference between it and calcareous earths, all of which are converted by calcination into a caustic quicklime.

The calcined magnesia is used for the same general purposes as the magnesia combined with fixed air. In certain affections of the stomach, accompanied with much flatulence, the calcined magnesia is found preferable, not only as containing more of the real earth of magnesia in a given quantity, but as being also deprived of its air. It neutralizes the acid of the stomach without that extrication of air which is often a troublesome consequence in employing the aerated magnesia in these complaints. It is proper to observe, that magnesia, whether combined with or deprived of fixed air, is similar to the mild calcareous earths in promoting and increasing putrefaction. The same has even been observed with respect to the Epsom and some other salts which have this earth for their base.

CHAP. IX. Preparations of Sulphur.

Washed flowers of sulphur. L.

250 Take of flowers of sulphur, one pound; distilled water, four pints. Boil the flowers of sulphur a little while in the distilled water; then pour off this water, and wash off the acid with cold water; lastly, dry the flowers.

In the former editions of our pharmacopœias directions were given for the preparation of the flowers of sulphur themselves; but as a large apparatus is necessary for doing it with any advantage, it is now scarcely ever attempted by the apothecaries. When the flowers are properly prepared, no change is made on the qualities of the sulphur. Its impurities only are separated; and at the same time it is reduced to a finer powder than it can easily be brought to by any other means. But as the flowers of sulphur are generally sublimed in very capacious rooms, which contain a large quantity of air, or in vessels not perfectly close, some of those that arise at first are apt to take fire, and thus are changed into a volatile acid vapour, which mingling with the flowers that sublime afterwards, communicates to them a considerable degree of acidity. In this case the ablution here directed is for the general use of the medicine absolutely necessary; for the flowers thus tainted with acid sometimes occasion gripes, and may in other respects be productive of effects different from those of pure sulphur. There are, however, some particular combinations to which they are supposed to be better adapted when unwashed, such as their union with mercury into æthiops mineral; and accordingly for that preparation the unwashed flowers are directed by the London college.

Sulphurated kali. L.

Take of flowers of sulphur, one ounce; kali, five ounces. Mix the salt with the melted sulphur, by frequently stirring, until they unite into an uniform mass.

This preparation, in the former editions of our pharmacopœias, had the name of *hepar sulphuris*, or *liver of sulphur*.

It is much more convenient to melt the sulphur first by itself, and add the salt of tartar by degrees, as here directed, than to grind them together, and afterwards endeavour to melt them, as ordered in former editions: for in this last case the mixture will not flow sufficiently thin to be properly united by stirring; and the sulphur either takes fire or sublimes in flowers, which probably has been the reason why so large a proportion of it has been commonly directed. Even in the present method a considerable part of the sulphur will be dissipated; and if it were not, the hepar would not be of its due quality: for one part of sulphur requires two of the alkaline salt to render it perfectly soluble in water, which this preparation ought to be.

The hepar sulphuris has a fetid smell and a nauseous taste. Solutions of it in water, made with sugar into a syrup, have been recommended in coughs and other disorders of the breast. Our pharmacopœias, nevertheless, have deservedly rejected this syrup, as common practice has almost done the balsams. Solutions of the hepar in water have been also recommended in herpetic and other cutaneous affections. Some physicians have even employed this solution, in a large quantity, as a bath for the cure of psora; and in cases of tinea capitis it has often been used by way of lotion.

The hepar, digested in rectified spirit of wine, imparts a rich gold colour, a warm, somewhat aromatic taste, and a peculiar, not ungrateful smell. A tincture of this kind is kept in the shops under the name of another mineral. The hepar sulphuris has been by some strongly recommended to prevent the effects of mineral poison.

Sulphurated oil and sulphurated petroleum. L.

252 Take of flowers of sulphur, four ounces; olive oil, sixteen ounces. Boil the flowers of brimstone with the oil, in a pot slightly covered, until they be united. In the same manner is made *sulphurated petroleum*.

These articles are analogous to what had formerly a place in our pharmacopœias under the titles of *balsamum sulphuris simplex*, *crassum*, et *Barbadense*. And, besides these, a place was also given to the *balsamum sulphuris anisatum*, *terebinthinatum*, &c. While these articles, however, are now banished from our pharmacopœias, even those retained are less in use than formerly.

These preparations are more conveniently and safely made in a tall glass body, with the mouth at least an inch in diameter, than in the circulatory or close vessels in which they have commonly been directed to be prepared: for when the sulphur and oil begin to act vehemently upon each other, they not only rarify into a large volume, but likewise throw out impetuously great quantities of an elastic vapour; which, if the vessels be closed, or the orifices not sufficient to allow it

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it a free exit, will infallibly burst them. Hoffman relates a very remarkable history of the effects of an accident of this kind. In the vessel above recommended the process may be completed, without danger, in four or five hours, by duly managing the fire, which should be very gentle for some time, and afterwards increased so as to make the oil just bubble or boil; in which state it should be kept till all the sulphur appears to be taken up.

Essential oils, employed as menstrua for sulphur, undergo a great alteration from the degree of heat necessary for enabling them to dissolve the sulphur; and hence the balsams have not near so much of their flavour as might be expected. It should therefore seem more eligible to add a proper quantity of the essential oils to the simple balsam: these readily incorporate by a gentle warmth, if the vessel be now and then shaken. We may thus compose a balsam more elegant than those made in the manner formerly recommended, and which retains so much of the flavour of the oil as is in some measure sufficient to cover the taste of the sulphur, and render it supportable.

The balsams of sulphur have been strongly recommended in coughs, consumptions, and other disorders of the breast and lungs; but the reputation which they have had in these cases does not appear to have been built on any fair trial or experience of their virtues. They are manifestly hot, acrimonious, and irritating; and therefore should be used with the utmost caution. They have frequently been found to injure the appetite, offend the stomach and viscera, parch the body, and occasion thirst and febrile heats. The dose of the simple balsam is from ten to forty drops: those with essential oils are not given in above half these quantities. Externally, they are employed for cleansing and healing foul running ulcers. Boerhaave conjectures that their use in these cases gave occasion to the virtues ascribed to them when taken internally.

Precipitated sulphur. L.

253 Take of sulphurated kali, six ounces; distilled water, one pound and a half; vitriolic acid, diluted, as much as is sufficient. Boil the sulphurated kali in the distilled water until it be dissolved. Filter the liquor through paper, to which add the vitriolic acid. Wash the precipitated powder by often pouring on water till it becomes insipid.

This preparation is not so white as that of the last pharmacopœia, which was made with quicklime; and which in some pharmacopœias had the name of *milk of sulphur*.

Pure milk of sulphur is not different in quality from pure sulphur itself; to which it is preferred in unguents, &c. only on account of its colour. The whiteness does not proceed from the sulphur having lost any of its parts in the operation, or from any new matter superadded: for if common sulphur be ground with alkaline salts, and set to sublime, it rises of a white like colour, the whole quantity of the alkali remaining unchanged; and if the milk be melted with a gentle fire, it returns into yellow sulphur again.

It may be observed, that the name *lac sulphuris*, or *milk of sulphur*, applied among us to the precipitate, is by the French writers confined to the white liquor before the precipitate has fallen from it.

CHAP. X. *Preparations of Antimony.*

ANTIMONY is composed of a metal, united with sulphur or common brimstone.

If powdered antimony be exposed to a gentle fire, the sulphur exhales; the metallic part remaining in form of a white calx, reducible, by proper fluxes, into a whitish brittle metal, called *regulus*. This is readily distinguished from the other bodies of that class, by its not being soluble in aquafortis; its proper menstruum is aqua-regia.

If aqua-regia be poured on crude antimony, the metallic part will be dissolved; and the sulphur thrown out, partly to the sides of the vessel, and partly to the surface of the liquor, in the form of a greyish yellow substance. This, separated and purified by sublimation, appears on all trials the same with pure common brimstone.

The metal freed from the sulphur naturally blended with it, and afterwards fused with common brimstone, resumes the appearance and qualities of crude antimony.

The antimonial metal is a medicine of the greatest power of any known substance; a quantity too minute to be sensible in the tenderest balance, is capable of producing violent effects, if taken dissolved, or in a soluble state. If given in such a form as to be immediately miscible with the animal fluids, it proves violently emetic; if so managed as to be more slowly acted on, cathartic; and in either case, if the dose be extremely small, diaphoretic. Thus, though vegetable acids extract so little from this metal, that the remainder seems to have lost nothing of its weight, the tinctures prove in large doses strongly emetic, and in smaller ones powerfully diaphoretic. The regulus has been cast into the form of pills, which acted as violent cathartics, though without suffering any sensible diminution of weight in their passage through the body; and this repeatedly for a great number of times.

This metal, divested of the inflammable principle which it has in common with other metallic bodies that are reducible to a calx, becomes indissoluble and inactive. The calx, nevertheless, urged with a strong fire, melts into a glass, which is as easy of solution, and as violent in operation, as the regulus itself: the glass, thoroughly mixed with such substances as prevent its solubility, as wax, resin, and the like, is again rendered mild.

VEGETABLE acids, as has already been observed, dissolve but an extremely minute portion of this metal: the solution nevertheless is powerfully emetic and cathartic. The nitrous and vitriolic acids only corrode it into a powder, to which they adhere so slightly as to be separable in a considerable degree by water, and totally by fire, leaving the regulus in form of a calx similar to that prepared by fire alone. The marine acid has a very different effect: this reduces the regulus into a violent corrosive; and though it difficultly unites, yet it adheres so very closely as not to be separable by any ablution, nor by fire, the regulus arising along with it. The nitrous or vitriolic acids expel the marine, and thus reduce the corrosive into a calx similar to the foregoing.

Sulphur remarkably abates the power of this metal: and hence crude antimony, in which the regulus

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lus appears to be combined with sulphur, from one-fourth to one-half its weight, proves altogether mild. If a part of the sulphur be taken away by such operations as do not destroy or calcine the metal, the remaining mass becomes proportionally more active.

The sulphur of antimony may be expelled by deflagration with nitre: the larger the quantity of nitre, to a certain point, the more of the sulphur will be dissipated, and the preparation will be the more active. If the quantity of nitre be more than sufficient to consume the sulphur, the rest of it, deflagrating with the inflammable principle of the regulus itself, renders it again mild.

The sulphur of antimony is likewise absorbed in fusion by certain metals and by alkaline salts. These last, when united with sulphur, prove a menstruum for all the metals (zinc excepted); and hence, if the fusion be long continued, the regulus is taken up, and rendered soluble in water.

From these particulars with respect to antimony, it may naturally be concluded, that it not only furnishes us with an useful and active medicine, but that it may also be exhibited for medical purposes under a great variety of different forms, and that the effects of these will be considerably diversified. And this has in reality been the case. For further information respecting antimony, and its uses in medicine, we refer our readers to the articles ANTIMONY; MATERIA MEDICA, p. 653, &c.; and CHEMISTRY-Index. But although there is perhaps no preparation there mentioned, which is not fitted to serve some useful purpose; yet the colleges both of London and Edinburgh have now restricted the number of preparations in their pharmacopœias to a few only. And it is highly probable, that from the proper employment of them, every useful purpose to be answered by antimony may be accomplished.

Calcined antimony. L.

- 255 Take of antimony, powdered, eight ounces; nitre, powdered, two pounds. Mix them, and cast the mixture by degrees into a red hot crucible. Burn the white matter about half an hour; and, when cold, powder it; after which wash it with distilled water.

In the last edition of the London pharmacopœia this preparation had the name of *calx of antimony*; and it may be considered as at least very nearly approaching to some other antimonials of the old pharmacopœias, particularly to the nitrated diaphoretic antimony, washed ditto, and sublimated nitre; none of which are now received as separate formulas of our pharmacopœia, and indeed even the calx of antimony itself, at least as thus prepared, has now no place in the Edinburgh pharmacopœia.

The calx of antimony, when freed by washing from the saline matter, is extremely mild, if not altogether inactive. Hoffman, Lemery, and others, assure us, that they have never experienced from it any such effects as its usual title imports: Boerhaave declares, that it is a mere metallic earth, entirely destitute of all medicinal virtue: and the committee of the London college admit that it has no sensible operation. The common dose is from five grains to a scruple, or half a dram; though Wilson relates, that he has

known it given by half ounces, and repeated two or three times a day, for several days together.

Some report that this calx, by keeping for a length of time, contracts an emetic quality: From whence it has been concluded, that the powers of the reguline part are not entirely destroyed; that the preparation has the virtues of other antimonials which are given as alteratives; that is, in such small doses as not to stimulate the primæ viæ; and that therefore diaphoretic antimony, or calcined antimony, as it is now more properly styled, is certainly among the mildest preparations of that mineral, and may be used for children, and similar delicate constitutions where the stomach and intestines are easily affected. The observations, however, from which these conclusions are drawn, does not appear to be well founded: Ludovici relates, that after keeping the powder for four years, it proved as mild as at first: and the Strasburgh pharmacopœia, with good reason, suspects, that where the calx has proved emetic, it had either been given in such cases as would of themselves have been attended with this symptom (for the great alexipharmac virtues attributed to it have occasioned it to be exhibited even in the more dangerous malignant fevers, and other disorders which are frequently accompanied with vomiting); or that it had not been sufficiently calcined, or perfectly freed from such part of the regulus as might remain uncalcined. The uncalcined part being grosser than the true calx, the separation is effected by often washing with water, in the same manner as directed for separating earthy powders from their grosser parts.

It has been observed, that when diaphoretic antimony is prepared with nitre abounding with sea-salt, of which all the common nitre contains some portion, the medicine has proved violently emetic. This effect is not owing to any particular quality of the sea-salt, but to its quantity, by which the proportion of the nitre to the antimony is rendered less.

The *nitrum sibiutum*, as it was called, is produced by the deflagration of the sulphur of the antimony with the nitre, in the same manner as the *sal polychrest*, from which it differs no otherwise than in retaining some portion of the antimonial calx.

Notwithstanding the doubts entertained by some respecting the activity of the antimonium calcinatum, yet the London college have in our opinion done right in retaining it. For while it is on all hands allowed that it is the mildest of our antimonials, there are some accurate observers who consider it as by no means inefficacious. Thus Dr Healde tells us, that he has been in the habit of employing it for upwards of 40 years, and is much deceived, if, when genuine, it be not productive of good effects.

Nitrated calx of antimony. E.

- 256 Take of antimony calcined for making the glass of antimony, and nitre, equal weights. Having mixed, and put them into a crucible, let them be heated, so that the matter shall be of a red colour for an hour; then let it be taken out of the crucible, and, after beating it, wash it repeatedly with warm water till it be insipid.

Although this preparation agrees nearly in name with the

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the preceding, and has been considered as being nearly a complete calx of antimony, yet there can be no doubt that it is a medicine of a much more active nature than the former; and in place of being one of the mildest of the antimonials, it often operates with great violence when given in doses of a few grains only.

But as the effects of every preparation of antimony, not already conjoined with an acid, must depend on the quantity and condition of the acid in the stomach, so the ablution of the base of the nitre in this process gives full power to the acid of the stomach to act as far as possible on the calx; whereas, when the unwashed calx is employed, a great quantity of the acid in the stomach is neutralized by the alkaline base of the nitre adhering to the calx. The nitrated calx of antimony is supposed to be nearly the same with the article which has been so much celebrated, and has had such an extensive sale under the title of *Dr James's fever powder*. And it was as an article which might be employed in the place of James's powder, that the Edinburgh college introduced this into their pharmacopœia. There is, however, reason to believe, that the preparation of James's powder is somewhat different from that here directed; but their effects, as far as our observation goes, appear to be very nearly the same.

The nitrated calx of antimony has been thought by some preferable to emetic tartar, where the permanent effects of a long-continued nausea are required, and where we wish our antimonials to pass the pylorus and produce purging. But, like every other preparation where the reguline part is only rendered active by the acid in the stomach, the nitrated calx of antimony is in all cases of uncertain operation: sometimes proving perfectly inert, and at other times very violent in its effects. The dose is generally 10 or 12 grains, and this is often given all at once; an inconvenience not attending the emetic tartar; the quantity and effects of which we can generally measure with surprising minuteness.

There is, however, reason to believe, that by means of James's powder, and the nitrated calx, an artificial termination of fever is sometimes accomplished, and that too more frequently than by emetic tartar. This perhaps may sometimes be the consequence of the violence with which they operate. At the same time it must be admitted, that even the most violent operation by no means ensures an immediate recovery, but that on the contrary it is sometimes manifestly attended with bad effects.

Crocus of antimony.

357 Take of antimony, powdered; nitre, powdered, of each one pound; sea-salt, one ounce. Mix, and put them by degrees into a red-hot crucible, and melt them with an augmented heat. Pour out the melted matter; and, when cold, separate it from the scoriæ. *L.*

Equal parts of antimony and nitre are to be injected by degrees into a red-hot crucible; when the debonation is over, separate the reddish metallic matter from the whitish crust; beat it into a powder, and edulcorate it by repeated washings with hot water, till the water comes off insipid. *E.*

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Here the antimonial sulphur is almost totally consumed, and the metallic part left divested of its corrector. These preparations, given from two to six grains, generally act as violent emetics, greatly disordering the constitution. But the operation, like that of every preparation of antimony whose reguline part is not joined with an acid, must be liable to variations, according to the quantity and condition of the acid in the stomach. Their principal use is in maniacal cases, as the basis of some other preparations; and among the farriers, who frequently give to horses an ounce or two a day, divided into different doses as an alterative: in these, and other quadrupeds, this medicine acts chiefly as a diaphoretic.

The chemists have been accustomed to make the crocus with a less proportion of nitre than what is directed above; and without any farther melting than what ensues from the heat which the matter acquires by deflagration, which, when the quantity is large, is very considerable: a little common salt is added to promote the fusion. The mixture is put by degrees into an iron pot or mortar, somewhat heated, and placed under a chimney: when the first ladleful is in, a piece of lighted charcoal is thrown to it, which sets the matter on fire; the rest of the mixture is then added by little and little; the deflagration is soon over, and the whole appears in perfect fusion: when cold, a considerable quantity of scoriæ is found on the surface; which scoriæ are easily knocked off with a hammer. The crocus prepared after this manner is of a redder colour than that of the former editions of the London pharmacopœia. And indeed the method now directed by the London college may be considered as founded on this: It differs principally from that of the Edinburgh college in the employment of the sea-salt, by which the process is much facilitated.

Muriated antimony. L.

Take of the crocus of antimony, powdered; vitriolic acid, each one pound; dry sea-salt, two pounds. Pour the vitriolic acid into a retort, adding by degrees the sea-salt and crocus of antimony, previously mixed; then distil in a sand-bath. Let the distilled matter be exposed to the air several days, and then let the fluid part be poured off from the dregs.

Butter of antimony. E.

Take of crude antimony, one part; corrosive sublimate of mercury, two parts. Grind them first separately; then thoroughly mix them together, taking the utmost care to avoid the vapours. Put the mixture into a coated glass retort (having a short wide neck), so as to fill one half of it: the retort being placed in a sand-furnace, and a receiver adapted to it, give first a gentle heat, that only a dewy vapour may arise: the fire being then increased, an oily liquor will ascend and congeal in the neck of the retort, appearing like ice, which is to be melted down by a live coal cautiously applied. This oily matter is to be rectified in a glass retort into a pellucid liquor.

The process here directed by the Edinburgh college, and which is nearly the same with what stood in

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the former edition of the London pharmacopœia, is extremely dangerous, inasmuch that even the life of the operator, though tolerably versed in common pharmacy, may be much endangered for want of due care. Boerhaave relates, that one, who from the title he gives him is not to be supposed inexpert in chemical operations, or unacquainted with the danger attending this, was suffocated for want of proper care to prevent the bursting of the retort. The fumes which arise, even upon mixing the antimony with the sublimate, are highly noxious, and sometimes issue so copiously and suddenly, as very difficultly to be avoided. The utmost circumspection therefore is necessary.

The caustic, or butter as it is called, appears to be a solution of the metallic part of the antimony in the marine acid of the sublimate: the sulphur of the antimony, and the mercury of the sublimate, remain at the bottom of the retort united into an æthiops. This solution does not succeed with spirit of salt in its liquid state, and cannot be effected, unless (as in the case of making sublimate) either the acid be highly concentrated, and both the ingredients strongly heated; or when the antimony is exposed to the vapours of the acid distilled from the black calx of manganese. By this last process a perfect solution of the regulus of antimony in the muriatic acid is effected. Of this more simple, more safe, and less expensive method of preparing muriated antimony, an account is given by Mr Russel in the Transactions of the Royal Society of Edinburgh.

If regulus of antimony were added in the distillation of spirit of sea-salt without water, a solution would also be made.

The method, however, now directed by the London college, in which vitriolic acid and sea-salt are employed to give a double elective attraction, is perhaps to be considered as preferable to any of the others. In this they have followed very nearly the directions given in the Pharmacopœia Suecica, which are taken from the process of Mr Scheele.

When the congealed matter that arises into the neck of the retort is liquified by the moisture of the air, it proves less corrosive than when melted down and rectified by heat; though it seems, in either case, to be sufficiently strong for the purposes of consuming fungous flesh and the callous lips of ulcers. It is remarkable, that though this saline concrete readily and almost entirely dissolves by the humidity of the air, only a small quantity of white powder separating, it nevertheless will not dissolve on putting water to it directly: even when previously liquefied by the air, the addition of water will precipitate the solution. And accordingly, by the addition of water is formed that once celebrated article known by the title of *mercurius vitæ*, or *Algeroth's powder*. This preparation, though never used by itself, is employed both by the Edinburgh and by some of the foreign colleges, in the formation of emetic tartar, the most useful of all the antimonials. And although chemists are not altogether agreed with regard to the best mode of making the tartarized antimony, yet we shall afterwards have occasion to observe, when treating of that article, that the preparation of it from the muriated antimony, or rather from its precipitate (*Algeroth's powder*), is perhaps the best mode which has

yet been practised. And were it even with no other intention than this, a safe, easy, and cheap method of forming a muriated antimony, may be considered as an important improvement in our pharmacopœias.

Antimonial powder. L.

Take of antimony, coarsely powdered, hartshorn shavings, each two pounds; mix, and put them into a wide red-hot iron pot, stirring constantly till the mass acquires a grey-colour. Powder the matter when cold, and put it into a coated crucible. Lute to it another crucible inverted, which has a small hole in its bottom: augment the fire by degrees to a red heat, and keep it so for two hours. Lastly, reduce the matter, when cold, to a very fine powder.

In this preparation, the metallic part of the antimony in a state of calx will be united with that part of the hartshorn which is indestructible by the action of fire, viz. its absorbent earth. If this powder be properly prepared, it is of a white colour. It is a mild antimonial preparation, and is given as an alterative from three to six grains for a dose. In this quantity, however, it sometimes creates nausea, and even vomits. In larger doses it proves emetic, and operates by stool.

Precipitated sulphur of antimony. L.

Take of antimony, powdered, two pounds; water of pure kali, four pints; distilled water, three pints; Mix, and boil them with a slow fire for three hours, constantly stirring, and adding the distilled water as it shall be wanted; strain the hot ley through a double linen cloth, and into the liquor, whilst yet hot, drop by degrees as much diluted vitriolic acid as is sufficient to precipitate the sulphur. Wash off, with warm water, the vitriolated kali.

Golden sulphur of antimony. E.

Boil, in an iron pot, four pounds of caustic ley diluted with three pints of water, and throw in by degrees two pounds of powdered antimony; keeping them continually stirring with an iron spatula for three hours, over a gentle fire, and occasionally supplying more water. The liquor loaded with the sulphur of antimony being then strained through a woollen cloth, drop into it gradually, while it continues hot, so much spirit of nitre, diluted with an equal quantity of water, as shall be sufficient to precipitate the sulphur, which is afterwards to be carefully washed with hot water.

The foregoing preparations are not strictly sulphurs; they contain a considerable quantity of the metallic part of the antimony, which is reducible from them by proper fluxes. These medicines must needs be liable to great variation in point of strength; and in this respect they are, perhaps, the most precarious, though some have affirmed that they are the most certain, of the antimonial medicines.

They prove emetic when taken on an empty stomach, in a dose of four, five, or six grains; but at present they are scarcely prescribed with this intention; being chiefly used as alterative deobstruents, particularly in cutaneous disorders. Their emetic quality is easily blunted, by making them up into pills with re-

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sins or extracts, and giving them on a full stomach: with these cautions they have been taken in the quantity of 16 grains a-day, and continued for a considerable time, without occasioning any disturbance upwards or downwards. As their strength is precarious, they should be taken at first in very small doses, and increased by degrees according to their effect.

A composition of the golden sulphur, with sweet mercury, has been found a powerful, yet safe alterative, in cutaneous disorders; and has completed a cure after salivation had failed. In venereal cases, likewise, this medicine has produced excellent effects. A mixture of equal parts of the sulphur and calomel (well triturated together, and made into pills with extracts, &c.) may be taken from four to eight or ten grains, morning and night; the patient keeping moderately warm, and drinking after each dose a draught of a decoction of the woods, or other similar liquor. This medicine generally promotes perspiration, scarcely occasioning any tendency to vomit or purge, or affecting the mouth.

Tartarized antimony. L.

- 263 Take of crocus of antimony, powdered, one pound and an half; crystals of tartar, two pounds; distilled water, two gallons: boil in a glass vessel about a quarter of an hour; filter through paper, and set aside the strained liquor to crystallize.

Emetic tartar. E.

- 264 Take of the butter of antimony what quantity you choose; pour it into warm water, in which so much of the purified vegetable fixed alkali has been previously dissolved, that the antimonial powder may be precipitated, which, after being well washed, is to be dried. Then to five pounds of water add of this powder nine drams, of crystals of tartar, beat into a very fine powder, two ounces and a half; boil for a little till the powders be dissolved. Let the strained solution be slowly evaporated in a glass vessel to a pellicle, so that crystals may be formed.

We have here two modes of making the most common, and perhaps we may add the most useful, of all the antimonial preparations, long known in the shops under the name of *emetic tartar*. These modes differ considerably from each other; but in both, the reguline part of the antimony is united with the acid of the tartar. It is perhaps difficult to say to which mode of preparation the preference is to be given; for on this subject the best chemists are still divided in their opinion. The mode directed by the London college is nearly the same with that in former editions of their pharmacopœia, while that now adopted by the Edinburgh college in which they have nearly followed the Pharmacopœia Rossica, is of later date. That in both ways a good emetic tartar may be formed, is very certain; but in our opinion, when it is formed of the precipitate from the muriatic acid, or the *poudre d'Algerotti*, as it has been called, there is the least chance of its being uncertain in its operation: and this method comes recommended to us on the authority of Bergman, Scheele, and some other of the first names in chemistry. Bergman advises, that the calx be precipitated by simple water, as being least liable to variation; and this is the direction followed in the Phar-

macopœia Rossica. But when the calx is precipitated by an alkaline ley, as is directed by the Edinburgh college, it is more certainly freed from the muriatic acid, and will of course be milder.

In the after part of the process, whether precipitate or crocus have been used, the quantity of the antimonial ought always to be some drams more than is absolutely necessary for saturating the acid of tartar, so that no crystals may shoot which are not impregnated with the active metallic part of the antimony. And in order to secure an uniform strength, some attention is necessary in collecting the crystals, as some may contain more metal than others. After they are all separated from the liquor, they ought to be beat together in a glass mortar into a fine powder, that the medicine may be of uniform strength.

Emetic tartar is, of all the preparations of antimony, the most certain in its operation.

It will be sufficient, in considering the medicinal effects of antimonials, that we should observe, once for all, that their emetic property depends on two different conditions of the reguline part: the first is where the reguline part is only active, by being rendered so from meeting with an acid in the stomach: the second is where the reguline part is already joined with an acid, rendering it active. It is obvious, that those preparations, reducible to the first head, must always be of uncertain operation. Such then is the equal uncertainty in the chemical condition and medicinal effects of the croci, the hepata, and the calces; all of which processes are different steps or degrees of freeing the reguline part from sulphur and phlogiston. It is equally plain, that the preparations coming under the second head must be always constant and certain in their operation. Such a one is emetic tartar, the dose and effects of which we can measure with great exactness.

The title of this medicine expresses its principal operation. It is one of the best of the antimonial emetics, acting more powerfully than the quantity of crocus contained in it would do by itself, though it does not so much ruffle the constitution. And indeed antimonials in general, when thus rendered soluble by vegetable acids, are more safe and certain in their effects than the violent preparations of that mineral exhibited by themselves; the former never varying in their action from a difference in the food taken during their use, or other similar circumstances; which occasioning more or less of the others to be dissolved, make them operate with different degrees of force. Thus, crude antimony, where acid food has been liberally taken, has sometimes proved violently emetic; whilst in other circumstances it has no such effect.

The dose of emetic tartar, when designed to produce the full effect of an emetic, is from two to four grains. It may likewise be advantageously given in much smaller doses as a nauseating and sudorific medicine.

Vitrified antimony. L.

- Take of powdered antimony, four ounces. Calcine it in a broad earthen vessel, with a fire gradually raised, stirring with an iron rod until it no longer emits a sulphureous smoke. Put this powder into a crucible, so as to fill two-thirds of it. A cover being fitted

on, make a fire under it, at first moderate, afterwards stronger, until the matter be melted. Pour out the melted glass.

Glass of antimony. E.

- 266 Strew antimony, beat into a coarse powder like sand, upon a shallow unglazed earthen vessel, and apply a gentle heat underneath, that the antimony may be heated slowly; keeping it at the same time continually stirring to prevent it from running into lumps. White vapours of a sulphureous smell will arise from it. If they cease to exhale with the degree of heat first applied, increase the fire a little, so that vapours may again arise: go on in this manner, till the powder, when brought to a red heat, exhales no more vapours. Melt the calx in a crucible with an intense heat, till it assumes the appearance of melted glass: then pour it out on a heated brass plate or dish.

The calcination of antimony, in order to procure transparent glass, succeeds very slowly, unless the operator be wary and circumspect in the management of it. The most convenient vessel is a broad shallow dish, or a smooth flat tile, placed under a chimney. The antimony should be the purer sort, such as is usually found at the apex of the cones; this, grossly powdered, is to be evenly spread over the bottom of the pan, so as not to lie above a quarter of an inch thick on any part. The fire should be at first no greater than is just sufficient to raise a fume from the antimony, which is to be now and then stirred: when the fumes begin to decay, increase the heat, taking care not to raise it so high as to melt the antimony, or run the powder into lumps; after some time the vessel may be made red-hot, and kept in this state until the matter will not, upon being stirred, any longer fume. If this part of the process be duly conducted, the antimony will appear in an uniform powder, without any lumps, and of a grey colour.

With this powder fill two-thirds of a crucible, which is to be covered with a tile, and placed in a wind-furnace. Gradually increase the fire till the calx be in perfect fusion, when it is to be now and then examined by dipping a clean iron wire into it. If the matter which adheres to the end of the wire appears smooth and equally transparent, the vitrification is completed, and the glass may be poured out upon a hot smooth stone or copperplate, and suffered to cool slowly to prevent its cracking and flying in pieces. It is of a transparent yellowish red colour.

The glass of antimony usually met with in the shops, is said to be prepared with certain additions; which may, perhaps, render it not so fit for the purpose here designed. By the method above directed, it may be easily made of the requisite perfection without any addition.

As antimony may be rendered nearly or altogether inactive by calcination, it might be expected that the calx and glass of the present process would be likewise inert. But here the calcination is far less perfect than in the other case, where the inflammable principle of the regulus is totally burnt out by deflagration with nitre; there the calx is of perfect whiteness, and a glass made from that calx (with the addition of any saline flux, for of itself it will not vitrify) has little colour:

but here so much of the inflammable principle is left, that the calx is grey, and the glass of a high colour. The calcined antimony is said by Boerhaave to be violently emetic. Experience has shown that the glass is so, in so much as to be unsafe for internal use. At present it is chiefly employed in forming some other antimonial preparations, particularly the cerated glass of antimony, the next article to be mentioned; and the wine of antimony, afterwards to be treated of under the head of wines. It is also not unfrequently employed in the formation of emetic tartar; and it was directed for that purpose in the last edition of the Edinburgh pharmacopœia, being perhaps even superior to the crocus of antimony.

Cerated glass of antimony. E.

Take of yellow wax, a dram; glass of antimony, reduced into powder, an ounce. Melt the wax in an iron vessel, and throw into it the powdered glass: keep the mixture over a gentle fire for half an hour, continually stirring it; then pour it out on paper, and when cold grind it into powder.

The glass melts in the wax with a very gentle heat: after it has been about twenty minutes on the fire, it begins to change its colour, and in ten more comes near to that of Scotch snuff; which is a mark of its being sufficiently prepared; the quantity set down above loses about one dram of its weight in the process.

This medicine was for some time much esteemed in dysenteries: several instances of its good effects in these cases may be seen in the fifth volume of the Edinburgh Essays, from which the above remarks on the preparations are taken. The dose is from two or three grains to twenty, according to the age and strength of the patient. In its operation, it makes some persons sick and vomit; it purges almost every one: though it has sometimes effected a cure without occasioning any evacuation or sickness. It is now, however, much less used than formerly.

Mr Geoffroy gives two pretty singular preparations of glass of antimony, which seem to have some affinity with this. One is made by digesting the glass, very finely levigated, with a solution of mastich made in spirit of wine, for three or four days, now and then shaking the mixture; and at last evaporating the spirit so as to leave the mastich and glass perfectly mixed. Glass of antimony thus prepared, is said not to prove emetic, but to act merely as a cathartic, and that not of the violent kind. A preparation like this was first published by Hartman, under the name of *Chylifla*.

The other preparation is made by burning spirit of wine on the glass three or four times, the powder being every time exquisitely rubbed upon a marble. The dose of this medicine is from ten grains to 20 or 30: it is said to operate mildly both upwards and downwards, and sometimes to prove sudorific.

Ceruse of antimony. Brun.

Take of regulus of antimony, one part; nitre, three parts. Deflagrate them together in the manner directed for the calcined antimony.

The result of this process and that formerly directed for the calcined antimony are nearly the same.

It is not necessary to use so much nitre here as when antimony

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antimony itself is employed: for the sulphur which the crude mineral contains, and which requires for its dissipation nearly an equal weight of nitre to the antimony, is here already separated. Two parts of nitre to one of the regulus are sufficient. It is better, however, to have an over, than an under, proportion of nitre, lest some parts of the regulus should escape being sufficiently calcined.

It may be proper to observe, that though crude antimony and the regulus yield the same calces, yet the salts separated in washing the calces are very different. As crude antimony contains common sulphur, the acid of the sulphur unites with the alkaline basis of the nitre, and the result is a neutral salt. As the regulus contains the phlogistic, or inflammable principle, but no sulphur, the nitre is alkalised, as it would be by charcoal or such like inflammable bodies, and is at the same time rendered more acrimonious than the common alkaline salts; probably owing to the calx absorbing the air of the alkali. If only equal parts of the regulus and nitre be employed, and the fire kept up strong for an hour or more, the salt will prove more caustic than even the potential caustic of the shops. But the causticity of the salt will still be far greater, if, instead of the simple regulus of antimony, the martial regulus be used.

Kermes mineral. Succ.

269 Take of crude antimony, powdered, half a pound; fixed vegetable alkali, two pounds; boiling water, eight pounds. Boil them together in an iron pot for a quarter of an hour, continually stirring the mixture with an iron spatula, and filter as speedily as possible while it is hot. The filtered liquor, set in cool places, will soon deposit a powder, which must be repeatedly washed, first with cold and afterwards with warm water, until it be perfectly insipid.

This medicine has of late been greatly esteemed in France, especially under the names of *Kermes mineral*, *pulvis Carthusianus*, *poudre des Chartreux*, &c. It was originally a preparation of Glauber, and for some time kept a great secret, till at length the French king purchased the preparation from M. de la Ligerie, for a considerable sum, and communicated it to the public in the year 1720. In virtue, it is not different from the sulphurs above-mentioned; all of them owe their efficacy to a part of the regulus of the antimony, which the alkaline salt, by the mediation of the sulphur, renders soluble in water.

Chemists are, however, divided in their opinions with respect to the precise chemical condition of the reguline part in the preparations called *hepata of antimony*. Some have alleged that they contain not a particle of alkaline salt: it is at any rate certain, that the quantity and condition of the reguline part must vary according to the different proportions of the ingredients, the time of the precipitation, the greater or less degree of causticity of the alkali employed, and several other circumstances. At best, the whole of them are liable to the same uncertainty in their operation as the calces of antimony.

Panacea of antimony.

270 Take of antimony, six ounces; nitre, two ounces;

common salt, an ounce and a half; charcoal, an ounce. Reduce them into a fine powder, and put the mixture into a red-hot crucible, by half a spoonful at a time, continuing the fire a quarter of an hour after the last injection: then either pour the matter into a cone, or let it cool in the crucible; which when cold must be broken to get it out. In the bottom will be found a quantity of regulus; above this a compact liver-coloured substance; and on the top a more spongy mass: this last is to be reduced into powder, edulcorated with water, and dried, when it appears of a fine golden colour.

This preparation is supposed to have been the basis of Lockyer's pills, which were formerly a celebrated purge. Ten grains of the powder, mixed with an ounce of white sugar-candy, and made up into a mass with mucilage of gum tragacanth, may be divided into an hundred small pills; of which one, two, or three, taken at a time, are said to work gently by stool and vomit. The compact liver-coloured substance, which lies immediately above the regulus, operates more severely. This last appears to be nearly of the same nature with the crocus of antimony, and the former with the golden sulphur.

CHAP. XI. Preparations of silver.

Nitrated silver. L.

Take of silver, one ounce; diluted nitrous acid, four ounces. Dissolve the silver in the nitrous acid, in a glass vessel, over a sand-heat; then evaporate with an heat gently raised: afterwards melt the residuum in a crucible, that it may be poured into proper forms, carefully avoiding too great a heat.

Salt of silver, commonly called lunar caustic. E.

Take of purest silver, beat into plates, and cut in pieces, four ounces; weak nitrous acid, eight ounces; purest water, four ounces. Dissolve the silver in a phial with a gentle heat, and evaporate the solution to dryness. Then put the mass into a large crucible, and apply the heat, at first gently, but augment it by degrees till the mass flows like oil; then pour it into iron moulds, previously heated, and greased with tallow.

These processes do not differ in any material particular. But the name of *nitrated silver* is preferable to the more indefinite one of *salt of silver*.

Strong spirit of nitre will dissolve somewhat more than half its weight of pure silver; and the weaker of the aquafortes, formerly described, proportionally less, according to their quantity of pure nitrous acid. Sometimes this spirit contains a portion of the vitriolic or marine acids; which, however minute, renders it unfit for dissolving this metal, and should therefore be carefully separated before the solution be attempted. The method which the refiners employ for examining the purity of their aquafortis, and purifying it if necessary, is to let fall into it a few drops of a perfect solution of silver already made: if the liquor remain clear, and grow not in the least turbid or whitish, it is fit for use; otherwise, they add a small quantity more of the solution, which immediately turns the whole of a milky white colour; the mixture being then suffered to rest for some time, deposits a white sediment; from which it is warily decanted, examined afresh, and

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if need be, farther purified by a fresh addition of the solution.

The silver beat into thin plates, as directed in the second of the above processes, needs not be cut in pieces: the solution will go on the more speedily if they are only turned round into spiral circumvolutions, so as to be conveniently got into the glass, with care that the several surfaces do not touch each other. By this management, a greater extent of the surface is exposed to the action of the menstruum, than when the plates are cut in pieces and laid above each other. Good aquafortis will dissolve about half its weight of silver; and it is not advisable to use a greater quantity of the menstruum than is sufficient for effecting the solution, for all the surplus must be evaporated in the subsequent fusion.

It is necessary to employ very pure water; for if hard water were used in this process, the nitrous acid would forsake a part of the silver to join with the calcareous earth of the imperfect nitrous selenite; whereby a part of the silver would be precipitated.

The crucible ought to be large enough to hold five or six times the quantity of the dry matter; for it bubbles and swells up greatly, and is consequently apt to run over. During this time, also, little drops are now and then spurted up, whose causticity is increased by their heat, against which the operator ought therefore to be on his guard. The fire must be kept moderate till this ebullition ceases, and till the matter becomes consistent in the heat that made it boil before: then quickly increase the fire till the matter flows thin at the bottom like oil, when it is to be immediately poured into the mould, without waiting till the fumes cease to appear; for when this happens, the preparation proves not only too thick to run freely into the mould, but likewise less corrosive than it is expected to be.

For want of a proper iron mould, one may be formed of tempered tobacco-pipe clay, not too moist, by making in a lump of it, with a smooth stick first greased, as many holes as there is occasion for: pour the liquid matter into these cavities, and when congealed take it out by breaking the mould. Each piece is to be wiped clean from the grease, and wrapt up in soft dry paper, not only to keep the air from acting on them, but likewise to prevent their corroding or discolouring the fingers in handling.

This preparation is a strong caustic; and is frequently employed as such for consuming warts and other fleshy excrescences, keeping down fungous flesh in wounds or ulcers, and other similar uses. It is rarely applied where a deep eschar is required, as in the laying open of imposthumations and tumors; for the quantity necessary for these purposes, liquefying by the moisture of the skin, spreads beyond the limits within which it is intended to operate.

The lunar pills.

373 Dissolve pure silver in aquafortis, as in the foregoing process; and after due evaporation, set the liquor aside to crystallize. Let the crystals be again dissolved in common water, and mixed with a solution of equal their weight of nitre. Evaporate this mixture to dryness, and continue the exsiccation with a

gentle heat, keeping the matter constantly stirring till no more fumes arise.

Here it is necessary to continue the fire till the fumes entirely cease, as more of the acid is required to be dissipated than in the preceding process. The preparation is, nevertheless, in taste very sharp, intensely bitter and nauseous: applied to ulcers, it acts as a caustic, but it is much milder than the foregoing. Boerhaave, Boyle, and others, commend it highly in hydropic cases. The former assures us, that two grains of it made into a pill with crumb of bread and a little sugar, and taken on an empty stomach (some warm water, sweetened with honey, being drank immediately after), purge gently without griping, and bring away a large quantity of water, almost without the patient's perceiving it: that it kills worms, and cures many inveterate ulcerous disorders. He nevertheless cautions against using it too freely, or in too large a dose; and observes, that it always proves corrosive and weakening, especially to the stomach.

CHAP. XII. Preparations of iron.

Ammoniacal iron. L.

Take of iron filings, one pound; sal ammoniac, two pounds. Mix, and sublime. What remains at the bottom of the vessel mix by rubbing together with the sublimed matter, and again sublime. 274

Martial flowers, commonly called Ens Veneris. E.

Take of colcothar of martial vitriol, washed and well dried; sal ammoniac, equal weights. Having mixed them well, sublime. 275

Though the mode of preparation directed by the two colleges is here different, yet the preparation is fundamentally the same; and it is perhaps difficult to say which mode of preparation is to be preferred as the easiest and best.

The name of *ens veneris* has by some been very improperly applied to this preparation, as it contains not a particle of copper. The proper *ens veneris* is prepared from the blue vitriol; but, as we shall soon see, is often not materially different from the *martial flowers*.

The success of this process depends principally on the fire being hastily raised, that the sal ammoniac may not sublime before the heat be sufficient to enable it to carry up a sufficient quantity of the iron. Hence glass vessels are not so proper as earthen or iron ones: for when the former are used, the fire cannot be raised quickly enough, without endangering the breaking of them. The most convenient vessel is an iron pot: to which may be luted an inverted earthen jar, having a small hole in its bottom to suffer the elastic vapours, which arise during the operation, to escape. It is of advantage to thoroughly mix the ingredients together, moisten them with a little water, and then gently dry them; and to repeat the pulverization, humedation, and exsiccation, two or three times, or oftener. If this method be followed, the sal ammoniac may be increased to three times the quantity of the iron, or farther; and a single sublimation will often be sufficient to raise flowers of a very deep orange colour.

This preparation is supposed to be highly aperient and

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and attenuating; though no otherwise so than the rest of the chalybeates, or at most only by virtue of the saline matter joined to the iron. It has been found of service in hysterical and hypochondriacal cases, and in distempers proceeding from a laxity and weakness of the solids, as the rickets. It may be conveniently taken in the form of a bolus, from two or three grains to ten: it is nauseous in a liquid form (unless in spirituous tincture); and occasions pills to swell and crumble, except such as are made of the gums.

Rust of iron. L.

- 276 Take of iron-filings, one pound; expose them to the air, often moistening them with water, until they be corroded into rust; then powder them in an iron mortar, and wash off with distilled water the very fine powder. But the remainder, which cannot by moderate rubbing be reduced into a powder capable of being easily washed off, must be moistened, exposed to the air for a longer time, and again powdered and washed as before. Let the washed powder be dried.

Rust of iron, commonly called prepared iron filings. E.

Set purified filings of iron in a moist place, that they may turn to rust, which is to be ground into an impalpable powder.

The cleansing of iron filings by means of a magnet is very tedious, and does not answer so well as might be expected; for if they be rusty, they will not be attracted by it, or not sufficiently: nor will they by this means be entirely freed from brass, copper, or other metallic substances which may adhere to them. It appears from the experiments of Henckel, that if iron be mixed by fusion with even its own weight of any of the other metals, regulus of antimony alone excepted, the compound will be vigorously attracted by the loadstone. The rust of iron is to be procured at a moderate rate from the dealers in iron, free from any impurities, except such as may be washed off by water.

The rust of iron is preferable as a medicine to the calces or croci, made by a strong fire. Hoffman relates, that he has frequently given it with remarkable success in obstinate chlorotic cases accompanied with excessive headaches and other violent symptoms; and that he usually joined with it pimpinella, arum root, and salt of tartar, with a little cinnamon and sugar. The dose is from four or five grains to twenty or thirty. Some have gone as far as a dram: but all the preparations of this metal answer best in small doses, which should rather be often repeated than enlarged.

Tartarized iron. L.

- 277 Take of filings of iron, one pound; powdered crystals of tartar, two pounds. Mix them with distilled water into a thick paste. Expose it to the air in an open earthen vessel for eight days; then grind the matter, dried in a bath of sand, to a very fine powder.

This is an useful preparation of iron, in which that metal is chiefly brought to a saline state by means of the cream of tartar. It has now for the first time a place in the London pharmacopœia; but it had before

been introduced into some of the foreign ones, particularly the pharmacopœia Genevensis, under the title of *mars tartarizatus*; and indeed it is almost precisely the same with the *mars solubilis* of the old editions of the Edinburgh pharmacopœia.

Vitriolated iron. L.

- Take of filings of iron, vitriolic acid, each eight ounces; distilled water, three pints. Mix them in a glass vessel; and when the effervescence has ceased, place the mixture for some time upon hot sand; then pour off the liquor, straining it through paper; and after due exhalation set it aside to crystallize. 278

Vitriol of iron, or salt of steel. E.

- Take of purified filings of iron, six ounces; vitriolic acid, eight ounces; water, two pounds and a half. Mix them; and when the effervescence ceases, let the mixture stand for some time upon warm sand; then strain the liquor through paper, and after due evaporation set it aside to crystallize. 279

During the dissolution of the iron an elastic vapour rises, which on the approach of flame catches fire and explodes, so as sometimes to burst the vessel. To this particular therefore the operator ought to have due regard.

This vapour is also noxious to animal life. It is the inflammable air of Dr Priestley.

The chemists are seldom at the trouble of preparing this salt according to the directions above given; but in its stead substitute common green vitriol, purified by solution in water, filtration, and crystallization. The only difference between the two is, that the common vitriol contains somewhat more metal in proportion to the acid: and hence in keeping, its green colour is much sooner debased by a rusty brownish cast. The superfluous quantity of metal may be easily separated, by suffering the solution of the vitriol to stand for some time in a cold place, when a brownish yellow ochery sediment will fall to the bottom; or it may be perfectly dissolved, and kept suspended by a suitable addition of oil of vitriol. If the vitriol be suspected to contain any cupreous matter, which the common English vitriol seldom does, though almost all the foreign vitriols do, the addition of some bright iron wire to the solution will both discover, and effectually separate, that metal: for the acid quits the copper to dissolve a proportionable quantity of the iron; and the copper, in its separation from the acid, adheres to the undissolved iron, and forms a skin of a true copper colour on its surface. Even a vitriol of pure copper may, on this principle, be converted into a pure vitriol of iron.

But though the vitriolic acid appears in this operation to have so much stronger a disposition to unite with iron than with copper, that it totally rejects the latter when the former is presented to it; the operator may nevertheless give a dangerous impregnation of copper to the purest and most saturated solution of iron in the vitriolic acid, by the use of copper vessels. If the martial solution be boiled in a copper vessel, it never fails to dissolve a part of the copper, distinguishable by its giving a cupreous stain to a piece of bright iron immersed in it. By the addition of the iron, the copper

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copper is separated; by boiling it again without iron, more of the copper is dissolved; and this may in like manner be separated by adding more iron.

The salt of steel is one of the most efficacious preparations of this metal; and not unfrequently made use of in cachectic and chlorotic cases, for exciting the uterine purgations, strengthening the tone of the viscera, and destroying worms. It may be conveniently taken in a liquid form, largely diluted with water: Boerhaave directs it to be dissolved in an hundred times its weight of water, and the solution to be taken in the dose of twelve ounces on an empty stomach, walking gently after it. Thus managed, he says, it opens the body, proves diuretic, kills and expels worms, tinges the excrements black, or forms them into a matter like clay, strengthens the fibres, and thus cures many different distempers. The quantity of vitriol in the above dose of the solution is fifty-seven grains and a half; but in common practice, such large doses of this strong chalybeate are never ventured on. Four or five grains, and in many cases half a grain, are sufficient for the intention in which chalybeate medicines are given. Very dilute solutions, as that of a grain of the salt in a pint of water, may be used as succedanea to the natural chalybeate waters, and will in many cases produce similar effects.

Colcothar of vitriol. E.

280 Let calcined vitriol be urged with a violent fire till it becomes of a very red colour.

In this preparation, the iron which had been brought to a saline state by means of the acid of vitriol, is again deprived of that acid by the action of fire. It may be considered therefore as differing in nothing from the residuum which remains in the retort, when vitriolic acid is distilled from martial vitriol. The colcothar is very rarely employed by itself for medical purposes; but it is used in the preparation of some other chalybeates, particularly the martial flowers, when prepared according to the method directed by the Edinburgh college.

Martial athiops. Gen.

281 Take of the rust of iron, as much as you please; olive oil, a sufficient quantity to make it into a paste. Let this be distilled in a retort by a strong fire to dryness. Keep the residuum reduced to a fine powder in a close vessel.

An article under this name had formerly a place in some of the old pharmacopœias, and is described by Lemery in the Memoirs of the French Academy; but it was formed by a tedious process, continued for several months by the aid of water. Here the process is much shorter, and is supposed to give nearly the same product. Some have recommended it, on the supposition that the iron is here obtained in a very subtil state; but it is not in general supposed to have any advantage over the other more common chalybeates.

Opening and astringent crocus of iron.

282 These are prepared by mixing iron filings with twice their weight of powdered sulphur, deflagrating in a red-hot crucible; and in the one case keeping the preparation over the fire till it assumes a red colour;

in the other, by reverberating it for a long time in the most extreme degree of heat.

Preparations under these names still retain a place in some of the foreign pharmacopœias, but they are variously prepared. They may, however, be considered as possessing the same medical powers; and although the preparations mentioned above probably differ from each other in their virtues, yet that difference is not of such a nature as is imported by the titles by which they are usually distinguished. For all the preparations of iron probably act by an astringent quality; and that which is above denominated the *astringent crocus* has probably least effect in that way. At one period, these preparations were not unfrequently in use; and they were given in the form of bolus, electuary, or pill, from a few grains to a scruple; but among us they are at present so little in use as to have no place in our pharmacopœias.

CHAP. XIII. *Preparations of Mercury.*

283 We have already treated of mercury in various parts of our work as we found occasion, and what we have already discussed it is unnecessary to repeat. See MERCURY, CHEMISTRY-Index, MATERIA MEDICA, p. 653. METALLURGY, and QUICKSILVER. On the whole, it appears evident that there is no article which has been employed for medical purposes in a greater variety of forms. The colleges of London and Edinburgh have admitted into their pharmacopœias only a few of these; but from the selection they have made, there is reason to believe that every useful purpose for which mercury has been employed may be answered; and these purposes are both numerous and considerable. For it is at least very generally allowed among intelligent practitioners, that there are few articles kept in the shops of our apothecaries which can be considered as so extensively useful.

Mercury or quicksilver, in its crude state, is a ponderous metallic fluid, totally volatile in a strong fire, and calcinable by a weaker one (though very difficultly) into a red powdery substance. It dissolves in the nitrous acid, is corroded by the vitriolic, but not acted on by the marine in its liquid state: it nevertheless may be combined with this last skilfully applied in the form of fume. Quicksilver unites by trituration with earthy, unctuous, resinous, and other similar substances, so as to lose its fluidity: triturated with sulphur, it forms a black mass, which by sublimation changes into a beautiful red one.

For the general virtues of the mercurial preparations, see some of the articles above referred to, and MEDICINE. Here we shall only observe, that while in certain circumstances they act as stimulants, and even as corrosives, to the parts to which they are applied; under a different management, when introduced into the habit, they seem to forward circulation through even the smallest and most remote vessels of the body; and may be so managed as to promote all the excretions. But while they thus operate as a powerful stimulus to the sanguiferous, and probably also to the lymphatic system, they seem to exert but little influence on the nervous system. By this means they prove eminently serviceable in some inveterate chronical disorders, proceeding from obstinate obstructions of the glands. Crude mercury has

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has no effect this way. Resolved into fume, or divided into minute particles, and prevented from reuniting by the interposition of other substances, it operates very powerfully, unless the dividing body be sulphur, which restrains its action. Combined with a small quantity of the mineral acids, it acts effectually, though in general mildly; with a larger, it proves violently corrosive.

Purified quicksilver. L.

- 284 Take of quicksilver, filings of iron, each four pounds. Rub them together, and distil from an iron vessel.

As in the distillation of quicksilver glass retorts are very liable to be broken, an iron one is here with propriety directed: and by the addition of the filings of iron, matters which might otherwise arise with the quicksilver will be more apt to be detained in the retort. But still this happens so readily, even merely with that degree of heat which is necessary to elevate the mercury, that it is very doubtful whether much advantage be obtained from this process; and accordingly it has now no place in the pharmacopœia of the Edinburgh college.

Acetated quicksilver. L.

- 285 Take of purified quicksilver, one pound; diluted nitrous acid, two pounds; water of kali, as much as is sufficient. Mix the quicksilver with the acid in a glass vessel, and dissolve it in a sand-bath; then drop in by degrees the water of kali, that the calx of quicksilver may be precipitated; wash this calx with plenty of distilled water, and dry it with a gentle heat. These things being done, take of the calx of quicksilver, above described, one pound; acetic acid, as much as is necessary to dissolve the calx. Mix them in a glass vessel; and the solution being completed, strain it through paper; then evaporate it till a pellicle appears, and set it aside to crystallize. Keep these crystals in a vessel close stopped.

Of all the saline preparations of mercury, it has long been the opinion of the best chemists, that those in which it was brought to a saline form, by means of acetic acid, would be the mildest; and such a preparation was conjectured to be the basis of a celebrated pill, prepared and sold by Mr Keyser. It was, however, found to be a very difficult matter to imitate his pill, or to obtain a combination of mercury with the acetic acid: but not long since, the process for preparing these pills was published by authority at Paris, after being purchased by the French king. The process here described though in some particulars much less operose than that of Mr Keyser, yet nearly approaches to it, and furnishes us with the mildest of the saline mercurials.

Calcined quicksilver. L.

- 286 Take of purified quicksilver, one pound; expose the quicksilver in a flat-bottomed glass cucurbit, to an heat of about 600 degrees in a sand-bath, till it becomes a red powder.

This preparation may now be made in a shorter time than by the process formerly directed in the London pharmacopœia, which in general required several months: for the access of air, without which calcina-

tion cannot be performed, was then very much excluded. Still, however, the process is a tedious one, and might perhaps be improved. A vessel might be so contrived, as to occasion a continual flux of air over the surface of the mercury.

This preparation is highly esteemed in venereal cases, and supposed to be the most efficacious and certain of all the mercurials. It may be advantageously given in conjunction with opiates: a bolus or pill, containing from half a grain to two grains of this calx, and a quarter or half a grain or more of opium, with the addition of some warm aromatic ingredient, may be taken every night. Thus managed, it acts mildly, though powerfully, as an alterative and diaphoretic: given by itself in larger doses, as four or five grains, it proves a rough emetic and cathartic.

Ash-coloured powder of mercury. E.

- Take of quicksilver, weak nitrous acid, equal weights. Mix them so as to dissolve the quicksilver; dilute the solution with pure water, and add spirit of sal ammoniac as much as is sufficient to separate the mercury perfectly from the acid; then wash the powder in pure water, and dry it.

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In this process the mercurial nitre is decomposed; the precipitate, therefore, is a calx of mercury, and the clear liquor a solution of nitrous ammoniac. From the great attraction which the nitrous acid has for phlogiston, or from its ready disposition to part with pure air, the precipitates of mercury from its solution in this acid are more completely in the state of a calx than those from any other menstruum. There are, however, several niceties to be observed in conducting this process. If we employ too small a proportion of acid, and assist the solution by heat, the solution will contain an excess of calx capable of being separated by the water; and the whole precipitate from such a solution would be of a white colour. If, on the other hand, we employ too large a proportion of acid, the mercury is then so far calcined as to be capable of being dissolved by the volatile alkali; and this might happen in proportion as the quantity should be superabundant to the neutralization of the acid. The use of the water is to dissolve the nitrous ammoniac as fast as it is formed, and thereby prevent it from falling down and mixing with the precipitate. It is necessary to employ the purest water. If such be used as contains a nitrous selenite, not only a part of the mercury may be precipitated by the base of the selenite, but this last might also be deposited by the succeeding addition of the alkali.

The ash-coloured powder of mercury has of late years been much celebrated for the cure of venereal affections. It was first proposed by Dr Saunders to be made by precipitating the mercury from calomel; as the best substitute for the tedious and expensive process of the precipitate *per se*, and of the grey powder produced by triture with gum arabic. From the testimony of Dr Home, and several other practitioners, we have no doubt of its being a very valuable preparation of mercury. It may be given in a bolus or wafer, in the quantity of from one to six or seven grains: the dose being gradually increased according to its effects upon the person.

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Quicksilver with chalk. L.

Take of purified quicksilver, three ounces; powdered chalk, five ounces. Rub them together until the globules disappear.

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In this preparation, as well as the two former, we have also the mercury in a state of calx; but in place of being brought to that state by the aid of fire or of acids, what may here be considered as calcination is effected by triture.

This preparation had no place in the former editions of the London pharmacopœia. A preparation nearly similar indeed, under the title of *mercurius alkalisatus*, in which crabs eyes were employed instead of chalk, had a place in the old editions of the Edinburgh pharmacopœia, but was rejected from the edition of 1744, and has never again been restored. One reason for rejecting it was its being liable to gross abuse in the preparation, by the addition of some intermedium, facilitating the union of mercury with the absorbent earth, but diminishing or altering its power. The present preparation is liable to the same objection. Some, however, are of opinion, that when duly prepared, it is an useful alterative. But there can be little doubt, that the absorbent earth, by destroying acid in the alimentary canal, will diminish the activity of the mercurial calx.

Muriated quicksilver. L.

289 Take of purified quicksilver, vitriolic acid, each two pounds; dried sea-salt, three pounds and an half. Mix the quicksilver with the acid in a glass vessel, and boil in a sand-heat until the matter be dried. Mix it, when cold, with the sea-salt, in a glass vessel; then sublime in a glass cucurbit, with a heat gradually raised. Lastly, let the sublimed matter be separated from the scorice.

Sublimate corrosive mercury. E.

290 Take of quicksilver, weak nitrous acid, each four ounces; calcined sea-salt, calcined vitriol, of each five ounces. Dissolve the quicksilver in the nitrous acid, and evaporate the solution to a white and thoroughly dry mass: then add the sea-salt and vitriol. Having ground and mixed them well together, put the whole into a phial, one half of which they ought to fill; then sublime in sand, first with a gentle, but afterwards with an increased, heat.

The sublimate prepared by either of these methods is the same, they both consist only of mercury and the acid of the sea-salt united together. In the process directed by the Edinburgh college, the materials being mixed and exposed to the fire, first the vitriol parts with its acid, which, dislodging those of the nitre and marine salt, takes their place. The marine acid, resolved into fume and assisted by the nitrous, dissolves the mercury, now also strongly heated. This acid, though it very difficultly acts on mercury, yet when thus once united with it, is more strongly retained thereby than any other acid. The nitrous spirit, therefore, having nothing to retain it (for its own basis and that of the sea-salt are both occupied by the vitriolic, and that which the vitriolic forsook to unite with these, is now scarcely combinable with it), arises; leaving the mercury and marine acid to sublime toge-

ther when the heat shall be strong enough to elevate them. Some small portion of the marine spirit arises along with the nitrous: and hence this compound acid has been usually employed instead of the *compound aquafortis*, to which it is similar, for making the red corrosive.

It appears, therefore, that the vitriol, and the bases of the nitre and sea-salt, are of no farther use in this process, than as convenient intermediums for facilitating the union of the mercury with the marine acids. They likewise serve to afford a support for the sublimate to rest upon, which thus assumes the form of a placenta or cake.

The process, however, now adopted by the London college, is a better and more simple one. There the mercury, corroded by the vitriolic acid into a white mass, is mixed with about an equal quantity of sea-salt, and set to sublime; the vitriolic acid quits the mercury to unite with the basis of the sea salt; and the acid of the sea-salt, now set at liberty, unites with the mercury, and sublimes with it into the compound required. The discovery of this method is generally attributed to Boulduc; though it is found also in Kunckel's *Laboratorium Chymicum*. When the process is conducted in this way, the residuous matter is a pure Glauber's salt, and the sublimate is also free of ferruginous matter; a greater or less quantity of which is very generally carried up along with the mercury when vitriol of iron is employed. Boulduc's method has therefore the advantage in this, that the proportion of mercury in a given quantity of sublimate must be less liable to variation.

If the mercury be corroded by the nitrous acid instead of the vitriolic, the event will be the same; that acid equally quitting the mercury, and setting loose the marine; and the sublimate made by this method is the same with the foregoing; but as the quantity of fixed matter is smaller, it more difficultly assumes the form of a cake. It requires indeed some skill in the operator to give it this appearance when either process is followed. When large quantities are made, this form may be easily obtained, by placing the matras no deeper in the sand than the surface of the matter contained in it; and removing a little of the sand from the sides of the glass, as soon as the flowers begin to appear in the neck; when the heat should likewise be somewhat lowered, and not at all raised during the whole process. The sublimation is known to be completed by the edges of the crystalline cake, which will form on the surface of the caput mortuum, appearing smooth and even, and a little removed from it.

Our apothecaries rarely, and few even of the chemists, attempt the making of this preparation themselves; greatest part of what is used among us comes from Venice and Holland. This foreign sublimate has been reported to be adulterated with arsenic. Some affirm, that this dangerous fraud may be discovered by the sublimate turning black on being moistened with alkaline ley; which by others is denied. As this point seemed of some importance to be determined, sundry experiments have been made with this view, which prove the insufficiency of alkalis for discovering arsenic. Alkaline ley, poured into a solution of pure arsenic, and into a mixture of the two solutions in different proportions, produced no blackness in any: and though

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though the pure sublimate, and the mixtures of it with arsenic, exhibited some differences in these trials, yet these differences were neither so constant nor so strongly marked, as to be laid down universally for criteria of the presence or absence of arsenic: different specimens of sublimate, known to be pure, have been found to differ considerably in this respect; probably from their holding a little more or less mercury in proportion to the acid, or from their retaining some small portion of those acids which were employed in the preparation as intermedia.

Some chemists deny the practicability of this adulteration. There is a process common in books of chemistry, wherein sublimate and arsenic being mixed together, and set to sublime, do not arise in one mass, or yield any thing similar to the preparation here intended: the arsenic absorbs the acid of the sublimate, and is reduced thereby into a liquid or butyraceous consistence; while the mercury, thus freed from the acid, distils in its fluid form: if the quantity of arsenic be insufficient to decompose the whole of the sublimate, the remainder of the sublimate concretes distinct from the arsenical butter. From whence they conclude, that arsenic and sublimate cannot be united together into a crystalline cake, the form in which this preparation is brought to us.

The above experiment is not altogether decisive; for though arsenic and sulphur do not assume the required form by the common process, it is possible they may by some other management. It will therefore be proper to point out means for the satisfaction of those who may be desirous of convincing themselves of the genuineness of this important preparation. Let some of the sublimate, powdered in a glass mortar, be well mixed with twice its weight of black flux, and a little filings or shavings of iron; put the mixture into a crucible capable of holding four or five times as much; give a gradual fire till the ebullition ceases, and then hastily increase it to a white heat. If no fumes of a garlic smell can be perceived during the process, and if the particles of iron retain their form without any of them being melted, we may be sure that the mixture contained no arsenic.

Sublimate is a most violent corrosive, soon corrupting and destroying all the parts of the body it touches. A solution of it in water, in the proportion of about a dram to a quart, is used for keeping down proud flesh, and cleansing foul ulcers; and a more diluted solution as a cosmetic, and for destroying cutaneous insects. But a great deal of caution is requisite even in these external uses of it.

Some have nevertheless ventured to give it internally, in the dose of one-tenth or one-eighth of a grain. Boerhaave relates, that if a grain of it be dissolved in an ounce or more of water, and a dram of this solution, sweetened with syrup of violets, be taken twice or thrice a day, it will prove efficacious in many distempers thought incurable; but he particularly cautions us not to venture upon it, unless the method of managing it be well known.

Sublimate dissolved in vinous spirit has of late been given internally in larger doses; from a quarter of a grain to half a grain. This method of using it was brought into repute by Baron Van Swieten at Vienna, especially for venereal maladies; and several trials of

it have also been made in this kingdom with success. Preparations and Compositions. Eight grains of the sublimate are dissolved in sixteen ounces of rectified spirit of wine or proof-spirit; the rectified spirit dissolves it more perfectly, and seems to make the medicine milder in its operation than the proof-spirit of the original prescription of Van Swieten. Of this solution, from one to two spoonfuls, that is, from half an ounce to an ounce, are given twice a day, and continued till all the symptoms are removed; observing to use a low diet, with plentiful dilution, otherwise the sublimate is apt to purge, and gripe severely. It generally purges more or less at the beginning, but afterwards seems to operate chiefly by urine and perspiration.

Sublimate consists of mercury united with a large quantity of marine acid. There are two general methods of destroying its corrosive quality, and rendering it mild; the one is, combining with it as much fresh mercury as the acid is capable of taking up; and the other, by separating a part of the acid by means of alkaline salts and earths. On the first principle sweet mercury is formed; on the latter, white precipitate. But before entering on these, it is proper to give the following formula.

Solution of corrosive sublimate mercury. E.

Take of corrosive sublimate mercury, six grains; sal ammoniac, twelve grains. Dissolve in a pound of distilled water. If hard water be used for this purpose, the solution suffers a kind of decomposition from the nitrous selenite of the water.

The solution of corrosive sublimate in water is very much assisted by sal ammoniac. There was a practice some years ago, of mixing up this solution with wheat flour into the consistence of pills for internal use; and the quantity of sublimate in each pill was easily ascertained.

This solution may also be used for washing venereal and other sores; but in many instances it will be found too acrid for that purpose, and will require to be weakened by the addition of a portion of water.

Calomel. L.

Take of muriated quicksilver, one pound; purified quicksilver, nine ounces. Rub them together till the globules disappear, and then sublime the mass. In the same manner repeat the sublimation four times. Afterwards rub the matter into a very fine powder, and wash it by pouring on boiling distilled water.

Sweet mercury. E.

Take of corrosive mercury sublimate, reduced to a powder in a glass mortar, four ounces; pure quicksilver, three ounces and a half. Mix them well together, by long trituration in a glass or marble mortar, until the quicksilver ceases to appear. Put the powder into an oblong phial, of such a size that only one-third of it may be filled; and set the glass in sand, that the mass may sublime. After the sublimation, break the glass; and the red powder which is found in its bottom, with the whitish one that sticks about the neck, being thrown away, let the white mercury be sublimed again three or four times, and reduced to a very fine powder.

The trituration of corrosive sublimate with quicksilver is a very noxious operation: for it is almost impossible, by any care, to prevent the lighter particles of the former from rising so as to affect the operator's eyes and mouth. It is nevertheless of the utmost consequence, that the ingredients be perfectly united before the sublimation is begun. It is necessary to pulverize the sublimate before the mercury is added to it: but this may be safely performed with a little caution; especially if during the pulverization the matter be now and then sprinkled with a little spirit of wine: this addition does not at all impede the union of the ingredients, or prejudice the sublimation: it will be convenient not to close the top of the subliming vessel with a cap of paper at first (as is usually practised), but to defer this till the mixture begins to sublime, that the spirit may escape.

The rationale of this process deserves particular attention; and the more so, as a mistaken theory herein has been productive of several errors with regard to the operation of mercurials in general. It is supposed, that the *dulcification*, as it is called, of the corrosive mercury is owing to the spiculæ or sharp points, on which its corrosiveness depends, being broken and worn off by the frequent sublimations. If this opinion were just, the corrosive would become mild, without any addition, barely by repeating the sublimation; but this is contrary to all experience. The abatement of the corrosive quality of the sublimate is entirely owing to the combination of as much fresh mercury as is capable of being united with it; and by whatever means this combination be effected, the preparation will be sufficiently dulcified. Triture and digestion promote the union of the two, while sublimation tends rather to disunite them. The prudent operator, therefore, will not be solicitous about separating such mercurial globules as appear distinct after the first sublimation: he will endeavour rather to combine them with the rest, by repeating the triture and digestion.

The college of Wirtemberg require their sweet mercury to be only twice sublimed, and the Augustan but once; and Neumann proposes making it directly by a single sublimation from the ingredients of the corrosive sublimate, by only taking the quicksilver in a larger proportion.

Mr Selle of Berlin has lately proposed a method of making sweet mercury nearly similar to that of Neumann. He directs, that to four ounces of pure quicksilver there should be added as much strong vitriolic acid. These are to be mixed over a strong fire till they become a solid hard mass. This mass is to be tritured in a stone mortar with two ounces and an half of quicksilver and four ounces and an half of dried common salt. And by a single, or at most two, sublimations, he assures us an excellent sweet mercury is obtained.

If the medicine made after either of these methods should prove in any degree acrid, water boiled on it for some time will dissolve and separate that part in which its acrimony consists. The marks of the preparation being sufficiently dulcified are, its being perfectly insipid to the taste, and indissoluble by long boiling in water. Whether the water in which it has been boiled has taken up any part of it, may be known by dropping into the liquor a ley of any fixed alkaline

salt, or any volatile alkaline spirit. If the decoction has any mercurial impregnation, it will grow turbid on this addition; if otherwise, it will continue limpid. But here care must be taken not to be deceived by any extraneous saline matter in the water itself. Most of the common spring waters turn milky on the addition of alkalis; and therefore, for experiments of this kind, distilled water or rain water ought to be used.

This name of *calomel*, though for a considerable time banished from our best pharmacopœias, is again restored by the London college. But we cannot help thinking, that they might easily have invented a name better expressing the constituent parts and nature of the preparation.

Calomel, or sweet mercury, may be considered as one of the most useful of the mercurial preparations; and it may be estimated as holding an intermediate place between the acetated quicksilver, one of the mildest of the saline preparations, and the muriated quicksilver, or corrosive sublimate, one of the most acrid of them.

Mild muriated quicksilver. L.

Take purified quicksilver, diluted nitrous acid, of each half a pound. Mix in a glass vessel, and set it aside until the quicksilver be dissolved. Let them boil, that the salt may be dissolved. Pour out the boiling liquor into a glass vessel into which another boiling liquor has been put before, consisting of sea-salt, four ounces; distilled water, eight pints. After a white powder has subsided to the bottom of the vessel, let the liquor swimming at the top be poured off, and the remaining powder be washed till it becomes insipid, with frequent affusions of hot water; then dried on blotting paper with a gentle heat.

This preparation had a place in former editions of the London and Edinburgh pharmacopœias under the name of *mercurius dulcis precipitatus*. But the process as now given is somewhat altered, being that of Mr Scheele of Sweden, who has recommended this as an easy and expeditious method of preparing sweet mercury or calomel.

It appears from several tests that this precipitate is equal in every respect to that prepared by the preceding processes. It is less troublesome and expensive, and the operator is not exposed to the noxious dust arising from the triture of the quicksilver with the corrosive sublimate, which necessarily happens by the common method. The powder is also finer than can be made from the common sublimed sweet mercury by any trituration whatever. The clear liquor standing over the precipitate is a solution of cubic or rhomboidal nitre.

Sweet mercury, which may be considered as precisely the same with the calomel and mild muriated quicksilver, appears to be one of the best and safest preparations of this mineral, when intended to act as a quick and general stimulant. Many of the more elaborate processes are no other than attempts to produce from mercury such a medicine as this really is. The dose, recommended by some for raising a salivation, is ten or fifteen grains taken in the form of a bolus or pill, every night or oftener, till the ptyalism begins. As an alterant and diaphoretic, it has been given in doses of five or six grains; a purgative being occasionally

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fionally interposed, to prevent its affecting the mouth. It answers, however, much better when given in smaller quantities, as one, two, or three grains every morning and evening, in conjunction with such substances as determine its action to the skin, as the extract or resin of guaiacum; the patient at the same time keeping warm, and drinking liberally of warm diluent liquors. By this method of managing it, obstinate cutaneous and venereal distempers have been successfully cured without any remarkable increase of the sensible evacuations. It is sometimes, however, difficult to measure its effects in this way; and it is so very apt to run off by the intestines, that we can seldom administer it in such a manner as to produce those permanent effects which are often required, and which we are able to do by other preparations. It has been lately proposed to rub the gums and inside of the mouth with this preparation, as a ready and effectual method of producing salivation. This practice has been particularly recommended in the internal hydrocephalus, where it is exceedingly difficult to excite a salivation by other means. The advantages of this practice are not fully confirmed by experience; and when mercury is attended with advantage in hydrocephalus, this is not probably the consequence of any discharge under the form of salivation, but merely of the mercury being introduced into the system in an active state, and thus promoting absorption. And salivation, when it arises from the internal use of mercury, may be considered as the strongest test of this; but this is by no means the case when salivation arises from a topical action on the excretories of saliva.

Red nitrated quicksilver. L.

- 295 Take of purified quicksilver, nitrous acid, each one pound; muriatic acid, one dram. Mix in a glass vessel, and dissolve the quicksilver in a sand bath; then raise the fire until the matter be formed into red crystals.

Red corrosive, commonly called red precipitated mercury. E.

- 296 Take of quicksilver, weak nitrous acid, each one pound. Let the quicksilver be dissolved in the acid, and then let the solution be evaporated to a white dry mass. This being beat into a powder, must be put into a glass retort, and subjected to a fire gradually increased, till a small quantity of it, taken out in a glass spoon, and allowed to cool, assumes the form of shining red squamæ. Let the vessel be then removed from the fire. During the process the matter must be carefully agitated by a glass rod, that it may be equally heated.

The marine acid, in the menstruum ordered in the first process, disposes the mercurial calx to assume the bright sparkling look admired in it; which, though perhaps no advantage to it as a medicine, ought nevertheless to be insisted on by the buyer as a mark of its goodness and strength. As soon as the matter has gained this appearance, it should be immediately removed from the fire, otherwise it will soon lose it again. The preparation of this red precipitate, as it is called, in perfection, is supposed by some to be a secret not known to our chemists, inasmuch that we are under the necessity of importing it from abroad. This reflection seems to be founded on misinformation.

We sometimes indeed receive considerable quantities of it from Holland; but this depends on the ingredients being commonly cheaper there than with us, and not on any secret in the manner of the preparation.

This precipitate is, as its title imports, an escharotic; and with this intention is frequently employed by the surgeons with basilicum and other dressings, for consuming fungous flesh in ulcers and the like purposes. It is subject to great uncertainty in point of strength, more or less of the acid exhaling according to the degree and continuance of the fire. The best criterion of its strength, as already observed, is its brilliant appearance; which is also the mark of its genuineness: if mixed with minium, which it is sometimes said to be, the duller hue will discover the abuse. This admixture may be more certainly detected by means of fire: the mercurial part will totally evaporate, leaving the minium behind.

Some have ventured to give this medicine internally in venereal, scrophulous, and other obstinate chronic disorders, in doses of two or three grains or more. But certainly the milder mercurials, properly managed, are capable of answering all that can be expected from this; without occasioning violent anxieties, tormina of the bowels, and similar ill consequences, which the best management can scarcely prevent this corrosive preparation from sometimes inducing. The chemists have contrived sundry methods of correcting and rendering it milder, by divesting it of a portion of the acid; but to no very good purpose, as they either leave the medicine still too corrosive, or render it similar to others which are procurable at an easier rate.

White calx of quicksilver. L.

- Take of muriated quicksilver, sal ammoniac, water of kali, each half a pound. Dissolve first the sal ammoniac, afterwards the muriatic quicksilver, in distilled water, and add the water of kali. Wash the precipitated powder until it becomes insipid. 297

White precipitate of mercury. E.

- Dissolve corrosive sublimate mercury in a sufficient quantity of hot water, and gradually drop into the solution some spirit of sal ammoniac as long as any precipitation ensues. Wash the precipitated powder with several fresh quantities of warm water. 298

These preparations are used chiefly in ointments, with which intention their fine white colour is no small recommendation to them. For internal purposes they are rarely employed, nor is it at all wanted: they are nearly similar to sweet mercury, but less certain in their effects.

Though the processes directed by the London and Edinburgh colleges be here somewhat different, yet the preparations are ultimately the same. The process described by the Edinburgh college is the most simple; but is liable to some objections.

Corrosive sublimate, as we have already seen, consists of mercury united with a large portion of acid. It is there dulcified by adding as much fresh mercury as is sufficient to saturate all the acid; here, by separating all the acid that is not saturated. This last way seems an unfrugal one, on account not only of the loss of the acid, but of the volatile spirit necessary for absorbing it. The operator may, however, if it should be thought.

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thought worth while, recover the volatile salt from the liquor, by adding to it, after the precipitate has been separated, a proper quantity of potash, and distilling with a gentle heat, in the same manner as for the spirit or volatile salt of sal ammoniac; for a true sal ammoniac is regenerated, in the precipitation, from the union of the volatile spirit with the marine acid of the sublimate. It is by no means advisable to use the liquor itself as a solution of sal ammoniac, or to separate the sal ammoniac from it by evaporation and crystallization, as a part of the mercury might be retained, and communicate dangerous qualities: but the volatile salt separated by distillation may be used without fear of its containing any mercury; none of which will arise with the heat by which the volatile salts are distilled.

Fixed alkalis answer as effectually for precipitating solutions of sublimate as the volatile; but the precipitate obtained by means of the former, instead of being white, as with the latter, is generally of a reddish yellow or orange colour. If sal ammoniac be dissolved along with the sublimate, the addition of fixed alkalis will, by extricating the volatile alkali of the sal ammoniac, occasion as white a precipitation as if the volatile salt had been previously separated and employed in its pure state; and this compendium is now allowed by the London college in the process which they have adopted.

There the sal ammoniac, besides its use in the capital intention, to make a white precipitation, promotes the solution of the sublimate; which of itself is difficultly, and scarcely at all totally, soluble by repeated boiling in water: for however skilfully it be prepared, some part of it will have an under-proportion of acid, and consequently approach to the state of sweet mercury. A good deal of care is requisite in the precipitation; for if too large a quantity of the fixed alkaline solution be imprudently added, the precipitate will lose the elegant white colour for which it is valued.

Quicksilver with sulphur. L.

- 299 Take of purified quicksilver, flowers of sulphur, each one pound. Rub them together until the globules disappear.

Æthiops mineral. E.

- 300 Take of quicksilver, flowers of sulphur, each equal weights. Grind them together in a glass or stone mortar, with a glass pestle, till the mercurial globules totally disappear.

An æthiops is made also with a double quantity of mercury.

We need hardly remark, that these preparations, though now differing in name, are in reality the same. Nor need we add, that the direction given by the Edinburgh college, of using a glass or stone mortar and pestle, is necessary and proper.

The union of the mercury and sulphur might be much facilitated by the assistance of a little warmth. Some are accustomed to make this preparation in a very expeditious manner, by melting the sulphur in an iron ladle, then adding the quicksilver, and stirring them together till the mixture be completed. The small degree of heat here sufficient cannot reasonably be supposed to do any injury to substances which have

already undergone much greater fires, not only in the extraction from their ores, but likewise in the purification of them directed in the pharmacopœia. In the following process they are exposed in conjunction to a strong fire, without suspicion of the compound receiving any ill quality from it. This much is certain, that the ingredients are more perfectly united by heat than by the degree of triture usually bestowed on them. From the æthiops prepared by triture, part of the mercury is apt to be squeezed out on making it into an electuary or pills; from that made by fire no separation is observed to happen.

Æthiops mineral is one of the most inactive of the mercurial preparations. Some practitioners, however, have represented it as possessing extraordinary virtues; and most people imagine it a medicine of some efficacy. But what benefit is to be expected from it in the common doses of eight or ten grains, or a scruple, may be judged from hence, that it has been taken in doses of several drams, and continued for a considerable time, without producing any remarkable effect. Sulphur eminently abates the power of all the more active minerals, and seems to be at the same time restrained by them from operating in the body itself. Boerhaave, who is in general sufficiently liberal in the commendation of medicines, disapproves of the æthiops in very strong terms. "It cannot enter the absorbent vessels, the lacteals, or lymphatics, but passes directly through the intestinal tube, where it may happen to destroy worms, if it operates luckily. They are deceived who expect any other effects from it; at least I myself could never find them. I am afraid it is unwarily given, in such large quantities, to children and persons of tender constitutions, as being a foreign mass, unconquerable by the body; the more to be suspected as it there continues long sluggish and inactive. It does not raise a salivation, because it cannot come into the blood. Who knows the effects of a substance, which, so long as it remains compounded, seems no more active than any ponderous insipid earth?" The æthiops, with a double proportion of mercury, now received into our pharmacopœias, has a greater chance for operating as a mercurial; and probably the quantity of mercury might be still further increased to advantage.

Red sulphurated quicksilver. L.

- Take of quicksilver, purified, forty ounces; sulphur, eight ounces. Mix the quicksilver with the melted sulphur; and if the mixture takes fire, extinguish it by covering the vessel; afterwards reduce the mass to powder, and sublime it.

It has been customary to order a larger quantity of sulphur than here directed; but smaller proportions answer better, for the less sulphur the finer coloured is the cinnabar.

As soon as the mercury and sulphur begin to unite, a considerable explosion frequently happens, and the mixture is very apt to take fire, especially if the process be somewhat hastily conducted. This accident the operator will have previous notice of, from the matter swelling up, and growing suddenly consistent: as soon as this happens, the vessel must be immediately close covered.

During the sublimation, care must be had that the matter

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matter rise not into the neck of the vessel, so as to block up and burst the glass. To prevent this, a wide-necked bolt head, or rather an oval earthen jar, coated, should be chosen for the subliming vessel. If the former be employed, it will be convenient to introduce at times an iron wire, somewhat heated, in order to be the better assured that the passage is not blocking up; the danger of which may be prevented by cautiously raising the vessel higher from the fire.

If the ingredients were pure, no feces will remain: in such cases, the sublimation may be known to be over by introducing a wire as before, and feeling there-with the bottom of the vessel, which will then be perfectly smooth: if any roughness or inequalities are perceived, either the mixture was impure, or the sublimation is not completed: if the latter be the case, the wire will soon be covered over with the rising cinnabar.

The preparers of cinnabar in large quantity employ earthen jars, which in shape pretty much resemble an egg. These are of different sizes, according to the quantity intended to be made at one sublimation, which sometimes amounts to two hundred weight. The jar is usually coated from the small end almost to the middle, to prevent its breaking by the vehemence or irregularity of the fire. The greater part, which is placed uppermost, not being received within the furnace, has no occasion for this defence. The whole secret with regard to this process, is the management of the fire, which should be so strong as to keep the matter continually subliming to the upper part of the jar, without coming out at its mouth, which is covered with an iron plate; care should also be taken to put into the subliming vessel only small quantities of the mixture at a time.

The principal use of cinnabar is as a pigment. It was formerly held in great esteem as a medicine in cutaneous foulnesses, gouty and rheumatic pains, epileptic cases, &c. but of late it has lost much of its reputation. It appears to be nearly similar to the æthiops already spoken of. Cartheuser relates, that having given cinnabar in large quantities to a dog, it produced no sensible effect, but was partly voided along with the feces unaltered, and partly found entire in the stomach and intestines on opening the animal. The celebrated Frederic Hoffman, after bestowing high encomiums on this preparation, as having in many instances within his own knowledge perfectly cured epilepsies and vertigoes from contusions of the head (where it is probable, however, that the cure did not so much depend on the cinnabar as on the spontaneous recovery of the parts from the external injury), observes, that the large repeated doses, necessary for having any effect, can be borne only where the first passages are strong; and that if the fibres of the stomach and intestines are lax and flaccid, the cinnabar, accumulated and concreting with the mucous matter of the parts, occasions great oppression; which seems to be an acknowledgment that the cinnabar is not subdued by the powers of digestion, and has no proper medicinal activity. There are indeed some instances of the daily use of cinnabar having brought on a salivation; perhaps from the cinnabar, used in those cases, having contained a less proportion of sulphur than the sorts commonly met with. The regulus of antimony, and even white ar-

senic, when combined with a certain quantity of common sulphur, seem to have their deleterious power destroyed: on separating more and more of the sulphur, they exert more and more of their proper virulence. It does not seem unreasonable to presume, that mercury may have its activity varied in the same manner; that when perfectly satiated with sulphur, it may be inert; and that when the quantity of sulphur is more and more lessened, the compound may have greater and greater degrees of the proper efficacy of mercurials.

Cinnabar is sometimes used in fumigations against venereal ulcers in the nose, mouth, and throat. Half a dram of it burnt, the fume being imbibed with the breath, has occasioned a violent salivation. This effect is by no means owing to the medicine as cinnabar: when set on fire, it is no longer a mixture of mercury and sulphur, but mercury resolved into fume, and blended in part with the volatile vitriolic acids; in either of which circumstances this mineral, as we have already observed, has very powerful effects.

Vitriolated quicksilver. L.

Take of quicksilver, purified, vitriolic acid, each one pound. Mix in a glass vessel, and heat them by degrees until they unite into a white mass, which is to be perfectly dried with a strong fire. This matter, on the affusion of a large quantity of hot distilled water, immediately becomes yellow, and falls to powder. Rub the powder carefully with this water in a glass mortar. After the powder has subsided, pour off the water; and, adding more distilled water several times, wash the matter till it become insipid.

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Yellow mercury, commonly called Turbith mineral. E.

Take of quicksilver, four ounces; vitriolic acid, eight ounces. Cautiously mix them together, and distil in a retort, placed in a sand furnace, to dryness: the white calx, which is left at the bottom, being ground to powder, must be thrown into warm water. It immediately assumes a yellow colour, but must afterwards be purified by repeated ablutions.

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The quantity of oil of vitriol, formerly directed, was double to that now employed by the Edinburgh college. The reduction made in this article greatly facilitates the process; and the proportions of the London college are perhaps preferable.

Boerhaave directs this preparation to be made in an open glass, slowly heated, and then placed immediately on burning coals; care being taken to avoid the fumes, which are extremely noxious. This method will succeed very well with a little address when the ingredients are in small quantity; but where the mixture is large, it is better to use a retort, placed in a sand-furnace, with a recipient, containing a small quantity of water, luted to it. Great care should be taken, when the oil of vitriol begins to bubble, that the heat be steadily kept up, without at all increasing it, till the ebullition ceases, when the fire should be augmented to the utmost degree, that as much as possible of the redundant acid may be expelled.

If the matter be but barely exsiccated, it proves a caustic salt, which in the ablution with water will almost all dissolve, leaving only a little quantity of turbith:

bith: the more of the acid that has been dissipated, the less of the remaining mercury will dissolve, and consequently the yield of turbith will be greater; fire expelling only such part of the acid as is not completely satiated with mercury, while water takes up always, along with the acid, a proportional quantity of the mercury itself. Even when the matter has been strongly calcined, a part will still be soluble; this evidently appears on pouring into the washings a little solution of fixed alkaline salt, which will throw down a considerable quantity of yellow precipitate, greatly resembling the turbith, except that it is less violent in operation.

From this experiment it appears, that the best method of edulcorating this powder is, by impregnating the water, intended to be used in its ablution, with a determined proportion of fixed alkaline salt; for by this means, the washed turbith will not only turn out greater in quantity, but, what is of more consequence, will have an equal degree of strength; a circumstance which deserves particularly to be considered, especially in making such preparations as, from an error in the process, may prove too violently corrosive to be used with any tolerable degree of safety. It is necessary to employ warm water if we are anxious for a fine colour. If cold water be used, the precipitate will be white.

It is observable, that though the superfluous acid be here absorbed from the mercury by the alkaline salt; yet in some circumstances this acid forsakes that salt to unite with mercury. If vitriolated tartar, or *vitriolated kali*, as it is now called, which is a combination of vitriolic acid with fixed alkali, be dissolved in water, and the solution added to a solution of mercury in aquafortis, the vitriolic acid will unite with the mercury, and form with it a turbith, which falls to the bottom; leaving only the alkali dissolved in the aquafortis, and united with its acid into a regenerated nitre. On this principle depends the preparation described by Wilson under the title of *an excellent precipitate of mercury*; which is no other than a true turbith, though not generally known to be such. It is made by dissolving four ounces of vitriolated kali in sixteen ounces of spirit of nitre; dissolving in this compound liquor four ounces of mercury; abstracting the menstruum by a sand heat; and edulcorating with water the gold-coloured mass which remains.

Turbith mineral is a strong emetic, and with this intention operates the most powerfully of all the mercurials that can be safely given internally. Its action, however, is not confined to the *primæ viæ*; it will sometimes excite a salivation, if a purgative be not taken soon after it. This medicine is used chiefly in virulent gonorrhœas, and other venereal cases, where there is a great flux of humours to the parts. Its chief use at present is in swellings of the testicle from a venereal affection; and it seems not only to act as a mercurial, but also, by the severe vomiting it occasions, to perform the office of a discutient, by accelerating the motion of the blood in the parts affected. It is said likewise to have been employed with success, in robust constitutions, against leprous disorders and obstinate glandular obstructions: the dose is from two grains to six or eight. It may be given in doses of a grain or two as an alterative and diaphoretic, in the same manner as the calcined mercury already spoken

of. Dr Hope has found that the turbith mineral is the most convenient errhine he has had occasion to employ.

This medicine was lately recommended as the most effectual preservative against the hydrophobia. It has been alleged there are several examples of its preventing madness in dogs which had been bitten; and some of its performing a cure after the madness was begun: from six or seven grains to a scruple may be given every day, or every second day, for a little time, and repeated at the two or three succeeding fulls and changes of the moon. Some few trials have likewise been made on human subjects bitten by mad dogs; and in these also the turbith, used either as an emetic or alterative, seemed to have good effects.

The washings of turbith mineral are used by some externally for the cure of the itch and other cutaneous foulnesses. In some cases mercurial lotions may be proper, but they are always to be used with great caution: this is by no means an eligible one, as being extremely unequal in point of strength, more or less of the mercury being dissolved, as has been observed above, according to the degree of calcination. The pharmacopœia of Paris directs a mercurial wash free from this inconvenience, under the title of *Aqua mercurialis*, or *Mercurius liquidus*. It is composed of one ounce of mercury, dissolved in a sufficient quantity of spirit of nitre, and diluted with 30 ounces of distilled water. In want of distilled water, rain water may be used; but of spring waters there are very few which will mix with the mercurial solution without growing turbid and precipitating a part of the mercury.

Simple mercurial solution. Jos. Jac. Plenck.

Take of purest quicksilver, one dram; gum arabic, two drams. Beat them in a stone mortar, adding by little and little distilled water of fumitory till the mercury thoroughly disappear in the mucilage. Having beat and mixed them thoroughly, add by degrees, and at the same time rubbing the whole together, syrup of kermes, half an ounce, distilled water of fumitory, eight ounces.

This mixture was much celebrated by its author as an effectual preparation of mercury, unattended with the inconvenience of producing a salivation; and he imagined that this depended on a peculiar affinity existing between mercury and mucilage. Hence such a conjunction, the gummy quicksilver, as it has been styled, has been the foundation of mixtures, pills, syrups, and several other formulæ, which it is unnecessary to dwell upon in this place.

By a long continued triture, mercury seems to undergo a degree of calcination; at least its globular appearance is not to be discerned by the best microscope; its colour is converted into that of a greyish powder; and from the inactive substance in its globular form, it is now become one of the most powerful preparations of this metallic body. The use of the gum seems to be nothing more than to afford the interposition of a viscid substance to keep the particles at a distance from each other, till the triture requisite to produce this change be performed. Dr Saunders has clearly proved, that no real solution takes place in this

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this process, and that though a quantity of mercurial particles are still retained in the mixture after the globular parts have been deposited by dilution with water, yet that this suspended mercurial matter is only diffused in the liquor, and capable of being perfectly separated by filtration. That long triture is capable of effecting the above change on mercury, is fully evinced from the well-known experiment of Dr Boerhaave, in producing a kind of calcined mercury by exposing quicksilver inclosed in a phial to the agitation produced by keeping the phial tied to a wind-mill for 14 years. By inclosing a pound of quicksilver in an iron box, with a quantity of iron nails and a small quantity of water, by the addition of which a greater degree of intestine motion is given to the particles of the mercury, and fixing the box to the wheel of a carriage, Dr Saunders obtained, during a journey of 400 miles, two ounces of a greyish powder, or calx of mercury.

On the above accounts we are not to ascribe the effects of Plenck's solution to an intimate division of the globules of mercury, nor to any affinity, nor elective attraction, between gum-arabic and mercury; which last Mr Plenck has very unphilosophically supposed. The same thing can be done by means of gum-tragacanth, by honey, and by sundry balsams. It is evidently owing to the conversion of the quicksilver to a calciform nature; but as this will be accomplished more or less completely according to the different circumstances during the triture, it is certainly preferable, instead of Plenck's solution, to diffuse in mucilage, or other viscid matters, a determinate quantity of the ash-coloured powder, or other calx of mercury.

It is proper to take notice, that there is in many instances a real advantage in employing mucilaginous matters along with mercurials, these being found to prevent diarrhoea and salivation to a remarkable degree. So far, then, Mr Plenck's solution is a good preparation of mercury, though his chemical rationale is perhaps erroneous. The distilled water and syrup are of no consequence to the preparation, either as facilitating the process, or for medicinal use.

It is always most expeditious to triturate the mercury with the gum in the state of mucilage. Dr Saunders found that the addition of honey was an excellent auxiliary; and the mucilage of gum-tragacanth seems better suited for this purpose than gum-arabic.

CHAP. XIV. Preparations of Lead.

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LEAD readily melts in the fire, and calcines into a dusky powder: which, if the flame is reverberated on it, becomes at first yellow, then red, and at length melts in a vitreous mass. This metal dissolves easily in the nitrous acid, difficultly in the vitriolic, and in small quantity in the vegetable acids; it is also soluble in expressed oil, especially when calcined.

Lead and its calces, while undissolved, have no considerable effects as medicines. Dissolved in oils, they are supposed to be (when externally applied) anti-inflammatory and desiccative. Combined with vegetable acids, they are remarkably so; and, taken internally, prove a powerful though dangerous styptic.

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There are two preparations of lead, *red* and *white* lead, as they are commonly called, which are much more extensively employed in other arts than in medicine, and of course they are prepared in large quantities. These formerly stood among the preparations in our pharmacopœias; but they are now referred to the materia medica. We shall not therefore, on the present occasion, make any farther observations with respect to them, but shall here insert from the old editions of the Edinburgh pharmacopœia the directions there given for preparing them.

Red lead.

Let any quantity of lead be melted in an unglazed earthen vessel, and kept stirring with an iron spatula till it falls into powder, at first blackish, afterwards yellow, and at length of a deep red colour, in which last state it is called *minium*; taking care not to raise the fire so high as to run the calx into a vitreous mass.

The preparation of red lead is so troublesome and tedious, as scarce ever to be attempted by the apothecary or chemist; nor indeed is this commodity expected to be made by them, the preparation of it being a distinct branch of business. The makers melt large quantities of lead at once, upon the bottom of a reverberatory furnace built for this purpose, and so contrived that the flame acts on a large surface of the metal, which is continually changed by means of iron rakes drawn backwards and forwards, till the fluidity of the lead is destroyed; after which, the calx is only now and then turned. By barely stirring the calx, as above directed, in a vessel over the fire, it acquires no redness; the reverberation of flame on the surface being absolutely necessary for this effect. It is said, that 20 pounds of lead gain, in this process, five pounds; and that the calx, being reduced into lead again, is found one pound less than the original weight of the metal.

These calces are employed in external applications, for abating inflammations, cleansing and healing ulcers, and the like. Their effects, however, are not very considerable; nor are they perhaps of much farther real use, than as they give consistence to the plaster, unguent, &c.

Ceruse or white lead.

Put some vinegar into the bottom of an earthen vessel, and suspend over the vinegar very thin plates of lead, in such a manner that the vapour which arises from the acid may circulate about the plates. Set the containing vessel in the heat of horse-dung for three weeks; if at the end of this time the plates be not totally calcined, scrape off the white powder, and expose them again to the steam of vinegar, till all the lead be thus corroded into powder.

The making of white lead is also become a trade by itself, and confined to a few persons, who have large conveniences for this purpose. The general method which they follow is nearly the same with that above described. See the Philosophical Transactions, n° 137.

In this preparation, the lead is so far opened by the acid, as to discover, when taken internally, the

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malignant quality of the metal; and to prove externally, when sprinkled on running sores, or ulcers, moderately cooling, drying, and astringent.

Acetated ceruse. L.

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Take of ceruse, one pound; distilled vinegar, one gallon and an half. Boil the ceruse with the vinegar until the vinegar is saturated: then filter thro' paper; and, after proper evaporation, set it aside to crystallize.

Salt, commonly called sugar of lead. E.

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Put any quantity of ceruse into a cucurbit, and pour upon it ten times its quantity of distilled vinegar. Let the mixture stand upon warm sand till the vinegar becomes sweet; when it is to be poured off, and fresh vinegar added as often as it comes off sweet. Then let all the vinegar be evaporated in a glass-vessel to the consistence of pretty thin honey, and set it aside in a cold place, that crystals may be formed, which are to be afterwards dried in the shade. The remaining liquor is again to be evaporated, that new crystals may be formed; the evaporation of the residuous liquor is to be repeated till no more crystals concrete.

Ceruse (especially that sort called *flake lead*, which is not, like the others, subject to adulteration) is much preferable either to minium or litharge, for making the sugar of lead: for the corrosion which it has undergone from the steam of the vinegar disposes it to dissolve more readily. It should be finely powdered before the vinegar be put to it; and during the digestion, or boiling, every now and then stirred up with a wooden spatula, to promote its dissolution, and prevent its concreting into a hard mass at the bottom. The strong acid obtained from the *caput mortuum* of vinegar may be employed for this purpose to better advantage than the weaker, though purer acid, above directed. If a small quantity of rectified spirit of wine be prudently added to the solution as soon as it is duly exhaled, and the mixture suffered to grow cold by slow degrees, the sugar will concrete into very large and transparent crystals, which are scarcely to be obtained by any other method.

If the crystals be dried in sunshine, they acquire a blackish or livid colour. This seems to happen from the absorption of light and its conversion into phlogiston. If it be owing to the escape of pure air, why are the rays of the sun necessary to this discharge? On whatever principles we account for it, the fact is the same; that the crystals soon lose their saline condition, and the lead gradually reassumes its metallic form. From this property of lead readily absorbing phlogiston, or parting with pure air, a solution of the sugar of lead becomes a very convenient sympathetic ink; on the same grounds it is also used for a more important purpose. As lead communicates a sweetness and astringency very similar to the product of the vinous fermentation, a practice formerly prevailed among fraudulent dealers, of correcting the too great sharpness of acid wines by adulterating them with this metal. The abuse may be detected in two different ways: a piece of paper may be moistened with the liquor to be examined, and then exposed to

the vapours of liver of sulphur: the moistened paper will become of a livid colour, and this will happen though 200 or 300 leaves of a book were interposed between the paper and the vapours; by this method, then, we make a kind of sympathetic ink. But the best way of making the test is, to drop a small quantity of a solution of the liver of sulphur into the suspected liquor: if there be any lead present, this addition will instantly occasion the precipitation of a livid or dark coloured cloud.

The sugar of lead is much more efficacious than the foregoing preparations, in answering the several intentions to which they are applied. Some have ventured upon it internally, in doses of a few grains, as a styptic in hæmorrhagies, profuse colliquative sweats, seminal fluxes, the fluor albus, &c. nor has it failed their expectations. It very powerfully restrains the discharge; but almost as certainly as it does this, it occasions symptoms of another kind, often more dangerous than those removed by it, and sometimes fatal. Violent pains in the bowels or through the whole body, and obstinate constipations, sometimes immediately follow, especially if the dose has been considerable: cramps, tremors, and weakness of the nerves, generally sooner or later ensue.

Boerhaave is of opinion, that this preparation proves malignant only as far as its acid happens to be absorbed in the body; for in such case, he says, "it returns again into ceruse, which is violently poisonous." On this principle it would follow, that in habits where acidities abound, the sugar of lead would be innocent. But this is far from being the case. Lead and its preparations act in the body only when they are combined with acid: ceruse possesses the qualities of the saccharum only in a low degree; and either of them freed from the acid has little, if any, effect at all. For the same reasons, the salt of lead is preferable to the pompous *extract* and *vegeto-mineral water* of Goulard, in which the lead is much less perfectly combined in a saline state. It is sometimes convenient to assist the solution of the sugar of lead in water, by adding a portion of vinegar. The effects of the external application of lead seems to differ from the strength of the solution: thus a very weak solution seems to diminish directly the action of the vessels, and is therefore more peculiarly proper in active inflammations, as of the eyes; whereas a strong solution operates as a direct stimulant, and is therefore more successful in passive ophthalmia.

Water of acetated litharge. L.

Take of litharge, two pounds and four ounces; distilled vinegar, one gallon. Mix, and boil to six pints, constantly stirring; then set it aside. After the feces have subsided, strain.

This preparation may be considered as nearly the same with the extract and vegeto-mineral water of Mr Goulard. And it is probably from the circumstances of his preparations having come into a common use, that the London college have given this article a place in their pharmacopœia. It may, however, be a matter of doubt whether it be really intitled to a place. For, as we have already observed, every purpose to be answered by it may be better obtained from the employment

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ployment of a solution of the acetated ceruse in simple water. The acetated water of litharge is intended for external use only.

CHAP. XV. *Preparations of tin.*

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TIN easily melts in the fire, and calcines into a dusky powder; which, by a farther continuance of the heat, becomes white. A mass of tin heated till it be just ready to melt, proves extremely brittle, so as to fall in pieces from a blow; and by dexterous agitation, into powder. Its proper menstruum is aqua-regia; though the other mineral acids may also be made to dissolve it, and the vegetable ones in small quantity. It crystallizes with the vegetable and vitriolic acids; but with the others, deliquesces.

The virtues of this metal are little known. It has been recommended as an antihysterical, antihæctic, &c. At present it is chiefly used as an anthelmintic.

Powdered tin. L.

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Take of tin, six pounds. Melt it in an iron vessel, and stir it with an iron rod until a powder floats on the surface. Take off the powder, and, when cold, pass it through a sieve.

This preparation may be considered as nearly the same with the calx Jovis, which had a place in the former editions of the Edinburgh pharmacopœia; but from the late editions the calx has been expunged, and the filings or powder of tin, has a place only in their list of the materia medica. But although seldom prepared by the apothecary himself, it is not unfrequently employed as a remedy against worms, particularly the flat kinds, which too often elude the force of other medicines. The general dose is from a scruple to a dram; some confine it to a few grains. But Dr Alston assures us, in the Edinburgh Essays, that its success chiefly depends on its being given in much larger quantities: he directs an ounce of the powder on an empty stomach, mixed with four ounces of molasses; next day, half an ounce; and the day following, half an ounce more; after which a cathartic is administered: he says the worms are usually voided during the operation of the purge, but that pains in the stomach occasioned by them are removed almost immediately upon taking the first dose of the tin.

This practice is sometimes successful in the expulsion of tænia, but by no means so frequently as Dr Alston's observations would lead us to hope.

Amalgama of tin. Dan.

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Take of shavings of pure tin, two ounces; pure quicksilver, three drams. Let them be rubbed to a powder in a stone mortar.

Some have imagined that tin thus acted on by mercury is in a more active condition than when exhibited in a state of powder: and accordingly it has been given in worm cases. But as both are equally insoluble in the animal fluids, this is not to be expected; and to obtain any peculiar properties which tin may possess to their full extent, it will probably be necessary to exhibit it in some saline state.

CHAP. XVI. *Preparations of zinc and copper.**Calcined zinc.* L.

TAKE of zinc, broken into small pieces, eight ounces.

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Cast the pieces of zinc, at several times, into an ignited, large, and deep crucible, placed leaning, or half-upright, putting on it another crucible in such a manner that the air may have free access to the burning zinc. Take out the calx as soon as it appears, and separate its white and lighter part by a fine sieve.

Flowers of zinc. E.

Let a large crucible be placed in a furnace, in an inclined situation, only half-upright; when the bottom of the vessel is moderately red, put a small piece of zinc, about the weight of two drams, into it. The zinc soon flames, and is at the same time converted into a spongy calx, which is to be raked from the surface of the metal with an iron spatula, that the combustion may proceed the more speedily: when the zinc ceases to flame, take the calx out of the crucible. Having put in another piece of zinc, the operation may be repeated as often as you please. Lastly, the calx is to be prepared like antimony.

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These flowers, as used externally, are preferable for medicinal purposes to tutty, and the more impure sublimes of zinc, which are obtained in the brass works; and likewise to calamine, the natural ore of this metal, which contains a large quantity of earth, and frequently a portion of heterogeneous metallic matter. But besides being applied externally, they have also of late been used internally. The flowers of zinc, in doses from one to seven or eight grains, have been much celebrated of late years in the cure of epilepsy and several spasmodic affections: and there are sufficient testimonies of their good effects, where tonic remedies in those affections are proper.

White vitriol. E.

Take of zinc, cut into small pieces, three ounces; vitriolic acid, five ounces; water, twenty ounces; having mixed the acid and water, add the zinc, and when the ebullition is finished strain the liquor; then after proper evaporation set it apart in a cold place, that it may shoot into crystals.

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This salt is an elegant white vitriol. It differs from the common white vitriol, and the salt of vitriol of the shops, only in being purer, and perfectly free from any admixture of copper, or such other foreign metallic bodies as the others generally contain.

Purified vitriolated zinc. L.

Take of white vitriol, one pound; vitriolic acid, one dram; boiling distilled water, three pints. Mix, and filter through paper. After a proper evaporation, set it aside in a cold place to crystallize.

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Although the Edinburgh college have given a formula for the preparations of white vitriol, yet their direction is very rarely followed by any of the apothecaries or chemists, who in general purchase it as obtained from the Goslar mines. When, however, it is got in this way, it is often a very impure salt, and re-

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quires that purification which is here directed, and which is by no means necessary for the white vitriol artificially prepared, in the manner above directed. But by this process, the ordinary white vitriol, in its common state of impurity, will be freed from those impregnations of earthy and other matters which it often contains. And in this purified state it answers many useful purposes, not only externally but internally; and particularly in doses from ten grains to half a dram, it operates almost instantly as an emetic, and is at the same time perfectly safe. By employing it internally, in smaller doses, we may obtain, and perhaps even more effectually, all the tonic power of the zinc; and some think it in every case preferable to the calx of zinc.

Ammoniacal copper. E.

- §18 Take of blue vitriol, two parts; volatile sal ammoniac, three parts; rub them together in a glass mortar, until they unite, after the effervescence ceases, into a uniform violet-coloured mass, which must be first dried on blotting paper, and afterwards by a gentle heat. The product must be kept in a glass phial, well closed with a glass stopper.

This preparation has been thought serviceable in epilepsies; but from its frequent want of success, and the disagreeable consequences with which its use is sometimes attended, it has not lately been much prescribed. It is employed by beginning with doses of half a grain, twice a day, and increasing them gradually to as much as the stomach will bear. Dr Cullen sometimes increased the dose to five grains.

CHAP. XVII. *Simple distilled waters. L. E.*

- 319 THE effluvia which exhale into the air from many vegetables, particularly from those of the odorous kind, consist apparently of principles of great subtilty and activity, capable of strongly and suddenly affecting the brain and nervous system, especially in those whose nerves are of great sensibility; and likewise of operating in a slower manner on the system of the grosser vessels. Thus Boerhaave observes, that in hysterical and hypochondriacal persons, the fragrant odour of the Indian hyacinth excites spasms, which the strong scent of rue relieves; that the effluvia of the walnut-tree occasion headaches, and make the body costive; that those of poppies procure sleep; and that the smell of bean-blossoms, long continued, disorders the senses. Lemery relates, from his own knowledge, that several persons were purged by staying long in a room where damask roses were drying.

Some of the chemists have indulged themselves in the pleasing survey of these presiding spirits, as they are called, of vegetables; their peculiar nature in the different species of plants; their exhalation into the atmosphere by the sun's heat, and dispersion by winds; their rendering the air of particular places medicinal, or otherwise, according to the nature of the plants that abound. They have contrived also different means for collecting these fugitive emanations, and concentrating and condensing them into a liquid form; employing either the native moisture of the subject, or an addition of water, as a vehicle or matrix for retaining them.

The process which has been judged most analogous to that of nature, is the following. The subject fresh gathered at the season of its greatest vigour, with the morning dew on it, is laid lightly and unbruised in a shallow vessel, to which is adapted a low head with a recipient; under the vessel a live coal is placed, and occasionally renewed, so as to keep up an uniform heat, no greater than that which obtains in the atmosphere in summer, viz. about 85 degrees of Fahrenheit's thermometer. In this degree of heat there arises exceeding slowly an invisible vapour, which condenses in the head into dewy drops, and falls down into the receiver; and which has been supposed to be the very substance that the plant would have spontaneously emitted in the open air.

But on submitting many kinds of odoriferous vegetables to this process, the liquors obtained by it have been found to be very different from the natural effluvia of the respective subjects: they have had very little smell, and no remarkable taste. It appeared that a heat, equal to that of the atmosphere, is incapable of raising in close vessels those parts of vegetables which they emit in the open air. It may therefore be presumed, that in this last case some other cause concurs to the effect: that it is not the sun's heat alone which raises and impregnates the air with the odorous principles of vegetables, but that the air itself, or the watery humidity with which it abounds, acting as a true solvent, extracts and imbibes them; so that the natural effluvia of a plant may be considered as an infusion of the plant made in air. The purgative virtue of the damask rose, and the astringency of the walnut-tree, which, as above observed, are in some degree communicated to the air, may be totally extracted by infusion both in watery and spirituous menstrua, but never rise in distillation with any degree of heat: and the volatile odours of aromatic herbs, which are diffused through the atmosphere in the lowest warmth, cannot be made to distil without a heat much greater than is ever found to obtain in a shaded air.

We apprehend, that the effluvia arising from growing vegetables are chiefly exhaled by the living energy of the plant: the odorous matter is a real secretion, which cannot be performed independent of active vessels; and it is as reasonable to allow the same powers for the exhalation of these effluvia, as for the transpiration of their watery parts.

The above process, therefore, and the theory on which it is built, appear to be faulty in two points: 1. In supposing that all these principles, which naturally exhale from vegetables, may be collected by distillation; whereas there are many which the air extracts in virtue of its solvent power; some are also incapable of being collected in a visible and inelastic form; and some are artificially separable by solvents only: 2. In employing a degree of heat insufficient for separating even those parts which are truly exhalable by heat.

The foregoing method of distillation is commonly called *distillation by the cold still*; but those who have practised it have generally employed a considerable heat. A shallow leaden vessel is filled with the fresh herbs, flowers, &c. which are heaped above it; so that when the head is fitted on, this also may be filled a considerable way. A little fire is made under the vessel,

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fel, sufficient to make the bottom much hotter than the hand can bear, care being only taken not to heat it so far as to endanger scorching any part of the subject. If the bottom of the vessel be not made so hot as to have this effect on the part contiguous to it, it is not to be feared that the heat communicated to the rest of the included matter will be so great as to do it any injury. By this management, the volatile parts of several odorous plants, as mint, are effectually forced over; and if the process has been skilfully managed, the distilled liquor proves richly impregnated with the native odour and flavour of the subject, without having received any kind of disagreeable impression from the heat used.

This process has been chiefly practised in private families; the slowness of the distillation, and the attendance and care necessary for preventing the scorching of some part of the plant, so as to communicate an ungrateful burnt flavour to the liquor, rendering it inconsistent with the dispatch requisite in the larger way of business.

Another method has therefore been had recourse to, viz. by the common still, called, in distinction from the foregoing, the *hot still*. Here a quantity of water is added to the plant to prevent its burning; and the liquor is kept nearly of a boiling heat, or made to boil fully, so that the vapour rises plentifully into the head, and passing thence into a spiral pipe or worm placed in a vessel of cold water, is there condensed, and runs out in drops quickly succeeding each other, or in a continued stream. The additional water does not at all weaken the produce; for the most volatile parts of the subject rise first, and impregnate the liquor that first distils: as soon as the plant has given over its virtue sufficiently, which is known by examining from time to time the liquor that runs from the nose of the worm, the distillation is to be stopped.

This is the method of distillation commonly practised for the officinal waters. It is accompanied with one imperfection, affecting chiefly those waters whose principal value consists in the delicacy of their flavour; this being not a little injured by the boiling heat usually employed, and by the agitation of the odorous particles of the subject with the water. Sometimes also a part of the plant sticks to the sides of the still, and is so far scorched as to give an ungrateful taint to the liquor.

There is another method of managing this operation, which has been recommended for the distillation of the more volatile essential oils, and which is equally applicable to that of the waters. In this way, the advantages of the foregoing methods are united, and their inconveniences obviated. A quantity of water being poured into the still, and the herbs or flowers placed in a basket over it, there can be no possibility of burning; the water may be made to boil, but so as not to rise up into the basket, which would defeat the intention of this contrivance. The hot vapour of the water passing lightly through all the interstices of the subject matter, imbibes and carries over the volatile parts unaltered in their native flavour. By this means the distilled waters of all those substances whose oils are of the most volatile kind, are obtained in the utmost perfection, and with sufficient dispatch; for which

last intention the still may be filled quite up to the head.

In the distillation of essential oils, the water, as was observed in the foregoing section, imbibes always a part of the oil. The distilled liquors here treated of, are no other than water thus impregnated with the essential oil of the subject; whatever smell, taste, or virtue is here communicated to the water, or obtained in the form of a watery liquor, being found in a concentrated state in the oil. The essential oil, or some part of it, more attenuated and subtilized than the rest, is the direct principle on which the title of *spiritus rectior*, or presiding spirit, has been bestowed.

All those vegetables therefore which contain an essential oil, will give over some virtue to water by distillation: but the degree of the impregnation of the water which a plant is capable of saturating with its virtue, are by no means in proportion to the quantity of its oil. The oil saturates only the water that comes over at the same time with it: if there be more oil than is sufficient for this saturation, the surplus separates, and concretes in its proper form, not miscible with the water that arises afterwards. Some odorous flowers, whose oil is in so small quantity, that scarcely any visible mark of it appears, unless fifty or an hundred pounds or more are distilled at once, give nevertheless as strong an impregnation to water as those plants which abound most with oil.

Many have been of opinion, that distilled waters may be more and more impregnated with the virtues of the subject, and their strength increased to any assigned degree, by *cobobation*, that is, by redistilling them a number of times from fresh parcels of the plant. Experience, however, shows the contrary; a water skilfully drawn in the first distillation, proves on every repeated one not stronger but more disagreeable. Aqueous liquors are not capable of imbibing above a certain quantity of the volatile oil of vegetables; and this they may be made to take up by one as well as by any number of distillations: the oftener the process is repeated, the ungrateful impression which they generally receive from the fire, even at the first time, becomes greater and greater. Those plants, which do not yield at first waters sufficiently strong, are not proper subjects for this process, since their virtue may be obtained much more advantageously by others.

General rules for the DISTILLATION of the OFFICINAL SIMPLE WATERS.

- I. Where they are directed fresh, such only must be employed: but some are allowed to be used dry, as being easily procurable in this state at all times of the year, though rather more elegant waters might be obtained from them while green.

When fresh and juicy herbs are to be distilled, thrice their weight of water will be fully sufficient; but dry ones require a much larger quantity. In general, there should be so much water, that after all intended to be distilled has come over, there may be liquor enough left to prevent the matter from burning to the still.

Plants differ so much, according to the soil and season of which they are the produce, and likewise according to their own age, that it is impossible to fix the

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the quantity of water to be drawn from a certain weight of them to any invariable standard. The distillation may always be continued as long as the liquor runs well flavoured off the subject, and no longer.

2. The distillation may be performed in an alembic with a refrigeratory, the junctures being luted.
3. If the herbs are of prime goodness, they must be taken in the weights prescribed: but when fresh ones are substituted for dry, or when the plants themselves are the produce of unfavourable seasons, and weaker than ordinary, the quantities are to be varied according to the discretion of the artist.

After the odorous water, alone intended for use, has come over, an acidulous liquor arises, which has sometimes extracted so much from the copper head of the still as to prove emetic. To this are owing the anthelmintic virtues attributed to certain distilled waters.

4. In a preceding edition of the Edinburgh pharmacopœia, some vegetables were ordered to be slightly fermented with the addition of yeast previously to the distillation.

The principle on which this management is founded, is certainly just; for the fermentation somewhat opens and unlocks their texture, so as to make them part with more in the subsequent distillation than could be drawn over from them without some assistance of this kind. Those plants, however, which require this treatment, are not proper subjects for simple waters to be drawn from, their virtues being obtainable to better advantage by other processes.

5. If any drops of oil swim on the surface of the water, they are to be carefully taken off.
6. That the waters may keep the better, about a 20th part their weight of proof-spirit may be added to each after they are distilled.

A great number of distilled waters were formerly kept in the shops, and are still retained in foreign pharmacopœias. The faculty of Paris direct, in the last edition of their *Codex Medicamentarius*, no less than 125 different waters, and 130 different ingredients in one single water. Nearly one half of these preparations have scarcely any virtue or flavour from the subject, and many of the others are insignificant.

The colleges of London and Edinburgh have rejected these ostentatious superfluities, and given an elegant and compendious set of waters, sufficient for answering such purposes as these kinds of preparations are applied to in practice. Distilled waters are employed chiefly as grateful diluents, as suitable vehicles for medicines of greater efficacy, or for rendering disgustful ones more acceptable to the palate and stomach; few are depended on, with any intention of consequence, by themselves.

Distilled water. L.

- 321 Take of spring-water, 10 gallons. Draw off by distillation, first, four pints; which being thrown away, draw off four gallons. This water is to be kept in a glass or earthen bottle with a glass stopper.

Distilled water. E.

Let well or river-water be distilled in very clean vessels till about two thirds are drawn off.

Native water is seldom or never found pure, and generally contains earthy, saline, metallic, or other matters. Distillation is therefore employed as a means of freeing it from these heterogeneous parts. For some pharmaceutical purposes distilled water is absolutely necessary: thus, if we employ hard undistilled water for dissolving sugar of lead, instead of a perfect solution, we produce a milky-like cloud, owing to a real decomposition of parts.

Distilled water is now employed by the London college for a great variety of purposes; and there can be no doubt, that in many chemical and pharmaceutical processes, the employment of a heterogeneous fluid, in place of the pure element, may produce an essential alteration of qualities, or frustrate the intention in view. While the London college have made more use of distilled water than any other, their directions for preparing it seem to be the best. For as some impregnations may be more volatile than pure water, the water may be freed from them by throwing away what comes first over; and by keeping it afterwards in a close vessel, absorption from the air is prevented.

Dill-water. L.

Take of dill-seed, bruised, one pound; water, sufficient to prevent an empyreuma. Draw off one gallon.

322

Simple dill-seed water. E.

Take of dill-seeds, one pound; pour on as much water as when ten pounds have been drawn off by distillation there may remain as much as is sufficient to prevent an empyreuma. After proper maceration, let ten pounds be drawn off.

Although the dill-water holds a place, not only in the London and Edinburgh pharmacopœias, but also in most of the foreign ones; yet it is not much employed in practice. It obtains, indeed, a pretty strong impregnation from the seeds, and is sometimes employed as a carminative, particularly as the basis of mixtures and juleps; but it is less powerful and less agreeable than that of peppermint, cinnamon, and some others.

Cinnamon-water. L. E.

Take of cinnamon, bruised, one pound; water, sufficient to prevent an empyreuma. Macerate for 24 hours, and draw off one gallon.

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From one pound of cinnamon the Edinburgh college direct 10 pounds of water to be drawn off; and if the cinnamon employed be of good quality, it may yield that quantity with a strong impregnation; but what comes over first is unquestionably the strongest.

This is a very grateful and useful water, possessing in an eminent degree the fragrance and aromatic cordial virtues of the spice. Where real cinnamon-water is wanted, care should be had in the choice of the cinnamon, to avoid the too common imposition of cassia being substituted in its room. The two drugs may be easily distinguished from each other by a variety of marks, which it is needless to introduce in this place. See CASSIA and CINNAMON. But the essential oils of the two approach so near, that after distillation it is perhaps impossible to distinguish the waters; and it is still more doubtful how far the one is in any degree preferable to the other.

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The oil of cinnamon is very ponderous, and arises more difficultly than that of any other of the vegetable matters from which simple waters are ordered to be drawn. This observation directs us, in the distillation of this water, to use a quick fire and a low vessel. For the same reason, the water does not keep so well as might be wished; the ponderous oil parting from it in time, and falling to the bottom, when the liquor loses its milky hue, its fragrant smell, and aromatic taste. Some recommend a small proportion of sugar to be added, in order to keep the oil united with the water.

Cassia-water. E.

- 324 From a pound and a half of the cassia bark, ten pounds of water are directed to be drawn off in the same manner as the dill-water.

This distilled water, as we have already observed, when properly prepared, approaches so near to that of cinnamon, that it is almost, if not altogether, impossible to distinguish the difference between the two. And although the London college has given it no place in their pharmacopœia, yet we may venture to assert, that it is no stranger to the shops of the apothecaries. Nay, so great is the difference of price, and the sensible qualities so nearly alike, that what is sold under the name of cinnamon-water is almost entirely prepared from cassia alone; and not even prepared from the cassia bark, as directed by the Edinburgh college, but from the cassia buds, which may be had at a still cheaper rate, and which yield precisely the same essential oil, although in less quantity. When cassia-water is prepared precisely according to the directions of the Edinburgh college, from containing a larger proportion of the subject, it has in general a stronger impregnation than their genuine cinnamon-water, and is probably in no degree inferior in its virtues.

Fennel-water. L.

- 325 Take of sweet fennel seeds, bruised, one pound; water, sufficient to prevent an empyreuma. Draw off one gallon.

The water of fennel seeds is not unpleasant. A water has also been distilled from the leaves. When these are employed, they should be taken before the plant has run into flower; for after this time they are much weaker and less agreeable. Some have observed, that the upper leaves and tops, before the flowers appear, yield a more elegant water, and a remarkably finer essential oil than the lower ones; and that the oil obtained from the one swims on water, while that of the other sinks. No part of the herb, however, is equal in flavour to the seeds.

Peppermint-water.

- 326 Take of herb of peppermint, dried, one pound and an half; water, sufficient to prevent an empyreuma. Draw off one gallon. L.

From three pounds of the leaves of peppermint, ten pounds of water are to be drawn off. E.

This is a very elegant and useful water. It has a warm pungent taste, exactly resembling that of the peppermint itself. A spoonful or two taken at a time warm the stomach, and give great relief in cold flatulent colics. Some have substituted a plain infusion of

the dried leaves of the plant, which is not greatly different in virtue from the distilled water.

In the distillation of this water, a considerable quantity of essential oil generally comes over in its pure state. And it is not uncommon to employ this for impregnating other water, with which it may be readily mixed by the aid of a little sugar.

Spearmint-water. L.

- Take of spearmint, dried, one pound and an half; water, sufficient to prevent an empyreuma. Draw off one gallon. 327

The Edinburgh college directs this water to be made in the same proportion as the preceding. But probably three pounds of the fresh herb will not give a stronger impregnation than a pound and a half of the dried: so that the water of the London college may be considered to be as strongly impregnated as that of the Edinburgh college.

This water smells and tastes very strongly of the mint; and proves in many cases an useful stomachic. Boerhaave commends it (cohobated) as a pleasant and incomparable remedy for strengthening a weak stomach, and curing vomiting proceeding from cold viscid phlegm, and also in lenteries.

All-spice water. L. E.

- Take of all-spice, bruised, half a pound; water, sufficient to prevent an empyreuma. Macerate for 24 hours, and draw off one gallon. 328

From half a pound of the pimento the Edinburgh college directs ten pounds of water to be drawn off; so that the impregnation is there somewhat weaker than the above.

This distilled water is a very elegant one, and has of late come pretty much into use; the hospitals employ it as a succedaneum to the more costly spice-waters. It is, however, inferior in gratefulness to the spirituous water of the same spice hereafter directed.

Pennyroyal-water. L. E.

- Take of dried herb pennyroyal, one pound and an half; water, sufficient to prevent an empyreuma. Draw off one gallon. 329

The pennyroyal-water is directed to be prepared by the Edinburgh college in the same proportions as the mint and peppermint. Whether prepared from the recent or dried plant, it possesses in a considerable degree the smell, taste, and virtues, of the pennyroyal. It is not unfrequently employed in hysterical cases, and sometimes with a good effect.

Rose-water. L. E.

- Take of fresh petals of the damask rose, the white heels being cut off, six pounds; water, sufficient to prevent an empyreuma. Draw off one gallon. 330

From the same quantity the Edinburgh college directs ten pounds to be drawn off.

This water is principally valued on account of its fine flavour, which approaches to that generally admired in the rose itself. The purgative virtue of the roses remains entire in the liquor left in the still, which has therefore been generally employed for making the solutive honey and syrup, instead of a decoction or infusion of fresh roses prepared on purpose; and this piece.

piece of frugality the college have now admitted. A distilled water of red roses has been sometimes called for in the shops, and supplied by that of damask roses diluted with common water. This is a very venial substitution; for the water drawn from the red rose has no quality which that of the damask does not possess in a far superior degree; neither the purgative virtue of the one nor the astringency of the other arising in distillation.

Lemon-peel-water. E.

- 331 From two pounds of recent lemon-peel ten pounds of water are to be drawn off by distillation.

Orange-peel-water. E.

- 332 From two pounds of orange-peel ten pounds of water are directed to be drawn off.

Neither of these distilled waters are now to be met with in the London pharmacopœia; and it is probable that no great loss arises from the want of them, for both the one and the other contain only a very weak impregnation. They are chiefly employed as diluents in fevers and other disorders where the stomach and palate are very apt to be disgusted. And perhaps the only circumstance for which they are valuable is the slightness of the impregnation; for in such affections, any flavour, however agreeable at other times, often becomes highly disgusting to patients.

The distilled waters above noticed are the whole that have now a place in the pharmacopœias of the London and Edinburgh colleges; and perhaps this selection is sufficiently large for answering every useful purpose. But besides these, a considerable number of others are still retained even in the modern foreign pharmacopœias; some of which at least it may not be improper to mention.

Alexiterial water. Brun.

- 333 Take of elder flowers, moderately dried, three pounds; angelica leaves, fresh gathered, two pounds; spring water, forty pounds. Draw off, by distillation, thirty pounds.

This water is sufficiently elegant with regard to taste and smell; though few expect from it such virtues as its title seems to imply. It is used occasionally for vehicles of alexipharmac medicines, or in juleps to be drank after them, as coinciding in the intention; but in general is not supposed to be itself of any considerable efficacy.

Camphor-water. Brun.

- 334 Take of camphor, an ounce and an half. Let it be dissolved in half an ounce of the spirit of rosemary, then pour on it two pounds of spring water, and draw off by distillation a pound and an half.

This distilled water, which has no place in our pharmacopœias, is introduced into some of the foreign ones. And since camphor may be considered as a concrete essential oil, it naturally occurs as a form under which that medicine may be introduced with advantage in a diluted state.

Castor-water. Brun.

- 335 Take of Russia castor, one ounce; water, as much as will prevent burning. Draw off two pints.

Castor yields almost all its flavour in distillation to water, but treated in the same manner with spirit of wine gives over nothing. The spirit of castor formerly kept in the shops had none of the smell or virtues of the drug; while the water here directed proves, when fresh drawn, very strong of it.

It is remarkable, that the virtues of this animal-substance reside in a volatile oil, analogous to the essential oils of vegetables. Some are reported to have obtained, in distilling large quantities of this drug, a small portion of oil, which smelt extremely strong of the castor, and diffused its ungrateful scent to a great distance.

This water is used in hysterical cases, and some nervous complaints, though it has not been found to answer what many people expect from it. It loses greatly of its flavour in keeping.

And it is probably from this circumstance that it has no place either in our pharmacopœias or in the modern foreign ones; but at the same time, as possessing in a high degree the sensible qualities of the castor, it may be considered as justly deserving future attention.

Chervil-water. Gen.

Take of fresh leaves of chervil, one pound; spring water, as much as is sufficient for allowing eight pounds to be drawn off by distillation, at the same time avoiding empyreuma.

Although the chervil be but little employed in Britain, yet among some of the foreigners it is held in high esteem; and the distilled water is perhaps one of the most elegant forms under which its active parts can be introduced. But there is reason to believe that those diuretic powers, for which it has been chiefly celebrated, will be most certainly obtained from exhibiting it in substance, or under the form of the expressed juice of the recent plant.

Black-cherry-water. Suec.

Take of ripe black cherries bruised with the kernels, 20 pounds; pure water, as much as is sufficient for avoiding empyreuma. Draw off 20 pounds by distillation.

This water, although now banished from our pharmacopœias, has long maintained a place in the foreign ones, and even in Britain it is not unfrequently to be met with in the shops. It has often been employed by physicians as a vehicle, in preference to the other distilled waters; and among nurses who have the care of young children has been the first remedy against the convulsive disorders to which infants are so often subject.

This water has nevertheless of late been brought into disrepute, and has been esteemed poisonous. They observe, that it receives its flavour principally from the cherry stones; and that these kernels, like many others, bear a resemblance in taste to the leaves of the lauro-cerasus, which have been discovered to yield, by infusion or distillation, the most sudden poison known. Some physicians of Worcester have lately found, by trial purposely made, that a distilled water very strongly impregnated with the flavour of the cherry kernels (no more than two pints being distilled from fourteen pounds of the cherry stones) proved in like manner

poisonous

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poisonous to brutes. The London college repeated the same experiment, and found the effects agreeable to those gentlemen's report.

It by no means follows from these trials, nor after such long experience can it be imagined, that black-cherry-water, when no stronger than the shops have been accustomed to prepare it, is unsafe. These kernels plainly resemble opium, and some other things, which poison only when taken in too great a quantity. The water from the very laurel leaves is harmless when duly diluted; and even spirit of wine proves a poison of its kind not greatly different, if drank to a certain degree of excess. Nor can it be concluded, from the trials with the strong black-cherry water on dogs, &c. that even this will have the same effects in the human body; the kernels of many sorts of fruits being in substance poisonous to brutes, though innocent to man.

It is possible, however, that this water in any degree of strength may not be altogether safe to the tender age of infants, where the principles of life are but just beginning as it were to move. It is possible that it may there have had pernicious effects without being suspected; the symptoms it would produce, if it should prove hurtful, being such as children are often thrown into from the disease which it is imagined to relieve. On these considerations, both the London and Edinburgh colleges have chosen to lay it aside; more especially as it has been too often counterfeited with a water distilled from bitter almonds, which are known to communicate a poisonous quality. It is, however, one of those active articles which may perhaps be considered as deserving farther attention.

Camomile-flower water. Dan.

- 338 Take of camomile flowers, dried in the shade, eight pounds; water, 72 pounds. Draw off by gentle distillation 48 pounds.

Camomile flowers were formerly ordered to be fermented previously to the distillation, a treatment which they do not need; for they give over, without any fermentation, as much as that process is capable of enabling them to do. In either case the smell and peculiar flavour of the flowers arise without any of the bitterness, this remaining behind in the decoction; which, if duly depurated and inspissated, yields an extract similar to that prepared from the flowers in the common manner. The distilled water has been used in flatulent colics and the like, but is at present held in no great esteem.

Strawberry-water. Succ.

- 339 From 20 pounds of strawberries 20 pounds of distilled water are drawn off, according to the same directions given for the preparation of the black cherry water.

Water thus impregnated with the essential oil of the strawberries some people will think of a very agreeable flavour, but any considerable medical power is not to be expected from it.

Hyssop-water. Succ.

- 340 From four pounds of the fresh leaves of hyssop six pounds of water are drawn off.

Hyssop water has been held by some in considerable esteem as an uterine and pectoral medicine. It was Vol. XIV. Part I.

directed in a former edition of the Edinburgh pharmacopœia for making up the black pectoral troches, but is now exchanged for common water. Few at present expect any singular virtues from it, nor is it often to be met with in our shops, being now expunged from our pharmacopœias. It holds a place, however, in most of the foreign ones, and among ourselves there are still some practitioners who frequently employ it. But there can be no doubt that those medical properties which the hyssop contains may be more readily and effectually extracted by simple infusion.

White-lily water. Brun.

Lily-of-the-valley water. Brun.

To any quantity of these flowers four times their weight of water is to be added, and water drawn off by distillation in the proportion of two pounds to each pound of the flowers.

These waters must obtain some impregnation of that elegant essential oil on which the odour of flowers in their growing state depends. But they do not possess any remarkable medical properties.

Balm-water. Brun.

The green leaves of the balm are to be macerated with double their weight of water; and from each pound of the plant a pound and an half of water is to be drawn off.

This water contains a considerable impregnation from the balm, which yields its essential oil pretty freely on distillation. Though now banished from our pharmacopœias, it has still a place in most of the foreign ones. In the old editions of the Edinburgh pharmacopœia, this water was ordered to be cohobated or redistilled from fresh quantities of the herb. This management seems to have been taken from Boerhaave, who has a very high opinion of the water thus prepared: he says, he has experienced in himself extraordinary effects from it taken on an empty stomach; that it has scarce its equal in hypochondriacal and hysterical cases, the chlorosis, and palpitation of the heart, as often as those diseases proceed from a disorder of the spirits, rather than from any collection of morbid matter.

But whatever virtues are lodged in balm, they may be much more perfectly and advantageously extracted by cold infusion in aqueous or spirituous menstrua: in this last process, the liquor suffers no injury from being returned on fresh parcels of the herb; a few repetitions will load it with the virtues of the subject, and render it very rich. The impregnation here is almost unlimited; but in distilled waters it is far otherwise.

Rue water. Ross.

From each pound of rue, with a sufficient quantity of spring-water to prevent empyreuma, two pounds of distilled water are to be drawn.

Rue gives over in this process the whole of its smell, and great part of its pungency. The distilled water stands recommended in epileptic cases, the hysterical passion, for promoting perspiration, and other natural secretions. But though it is a good deal employed abroad, it is with us falling into disrepute.

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Savin-water.

This is distilled from the fresh leaves of savin, after the same manner as the other already mentioned.

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This water is by some held in considerable esteem for the same purposes as the distilled oil of savin. Boerhaave relates, that he has found it (when prepared by cohobation) to give an almost incredible motion to the whole nervous system; and that, when properly used, it proves eminently serviceable for promoting the menses and the hæmorrhoidal flux.

It has now, however, fallen so much into disrepute as to have no place either in our pharmacopœias or in the best modern foreign ones: But at the same time, when we reflect how readily savin yields a large proportion of active essential oil on distillation, it may perhaps be considered as better intitled to attention than some other distilled waters which are still retained.

Elder-flower water. Brun.

345

This is distilled from fresh elder flowers, after the same manner as the white-lily water.

This water smells considerably of the flowers; but is rarely used among us.

Sage-water. Brun.

346

This is directed to be prepared from the green leaves of the sage in the same manner as the balm water.

Sage leaves contain a considerable proportion of essential oil, which they yield pretty freely on distillation. But their whole medical properties may with still greater ease and advantage be extracted by simple infusion.

To the simple distilled waters the London college have annexed the following remarks.

We have ordered the waters to be distilled from the dried herbs, because fresh are not ready at all times of the year. Whenever the fresh are used, the weights are to be increased. But, whether the fresh or dried herbs be employed, the operator may vary the weight according to the season in which they have been produced and collected.

Herbs and seeds kept beyond the space of a year are less proper for the distillation of waters.

To every gallon of these waters add five ounces, by measure, of proof-spirit.

CHAP. XVIII. *Distilled Spirits.*

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THE flavours and virtues of distilled waters are owing, as was observed in the preceding chapter, to their being impregnated with a portion of the essential oil of the subject from which they are drawn. Spirit of wine, considered as a vehicle for these oils, has this advantage above water, that it is their proper menstruum, and keeps all the oil that rises with it perfectly dissolved into an uniform limpid liquor.

Nevertheless, many substances, which, on being distilled with water, impart to it their virtues in great perfection; if treated in the same manner with spirit of wine, scarcely give it any smell or taste. This difference proceeds from hence, that spirit is not susceptible of so great a degree of heat as water. Liquids

in general, when made to boil, have received as great a heat as they are capable of sustaining: now, if the extent of heat between freezing and boiling water, as measured by thermometers, be taken for a standard, spirit of wine will be found to boil with less than four-fifths of that heat, or above one-fifth less than the heat of boiling water. It is obvious, therefore, that substances may be volatile enough to rise with the heat of boiling water, but not with that of boiling spirit.

Thus, if cinnamon, for instance, be committed to distillation with a mixture of spirit of wine and water, or with a pure proof-spirit, which is no other than a mixture of about equal parts of the two; the spirit will rise first, clear, colourless, and transparent, and almost without any taste of the spice; but as soon as the more ponderous watery fluid begins to rise, the oil comes over freely with it, so as to render the liquor highly odorous, sapid, and of a milky hue.

The proof-spirits usually met with in the shops are accompanied with a degree of ill flavour; which, though concealed by means of certain additions, plainly discovers itself in distillation. This nauseous relish does not begin to rise till after the purer spirituous part has come over; which is the very time that the virtues of the ingredients begin also most plentifully to distil: and hence the liquor receives an ungrateful taint. To this cause principally is owing the general complaint, that the cordials of the apothecary are less agreeable than those of the same kind prepared by the distiller; the latter being extremely curious in rectifying or purifying the spirits (when designed for what he calls fine goods) from all ill flavour.

Ardent spirit. L.

Take of rectified spirit of wine, one gallon; kali, made hot, one pound and an half; pure kali, one ounce. Mix the spirit of wine with the pure kali, and afterwards add one pound of the hot kali; shake them, and digest for twenty-four hours. Pour off the spirit, to which add the rest of the kali, and distil in a water bath. It is to be kept in a vessel well stopped. The specific gravity of the alcohol is to that of distilled water as 815 to 1000.

We have already offered some observations on spirit of wine both in the state of what is called *rectified* and *proof-spirit*. But in the present formula we have ardent spirit still more freed from an admixture of water than even the former of these. And in this state it is unquestionably best fitted for answering some purposes. It may therefore be justly considered as an omission in the present edition of the Edinburgh pharmacopœia, that they have no analogous form. In former editions of this work, alcohol was directed to be prepared from French brandy. But this is rather too dear an article in this country for distillation; nor is the spirit obtained from it anywise preferable to one procurable from cheaper liquors. The coarser inflammable spirits may be rendered perfectly pure, and fit for the nicest purposes, by the following method.

If the spirit be exceedingly foul, mix it with about an equal quantity of water, and distil with a slow fire; discontinuing the operation as soon as the liquor begins to run milky, and discovers by its nauseous taste that the impure and phlegmatic part is rising. By this

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treatment, the spirit leaves a considerable portion of its foul oily matter behind it in the water, which now appears milky and turbid, and proves highly disagreeable to the taste. If the spirit be not very foul at first, this ablution is not necessary; if extremely so, it will be needful to repeat it once, twice, or oftener.

As vinous spirits arise with a less degree of fire than watery liquors, we are hence directed to employ, in the distillation of them, a heat less than that in which water boils; and if due regard be had to this circumstance, very weak spirits may, by one or two wary distillations, be tolerably well freed from their aqueous phlegm; especially if the distilling vessels are of such a height, that the spirit, by the heat of a water-bath, may but just pass over them: in this case, the phlegmatic vapours which rise for a little way along with the spirit, will condense and fall back again before they can come to the head. Very pompous instruments have been contrived for this purpose, and carried in a spiral or serpentine form to an extraordinary height. The spirit ascending through these, was to leave all the watery parts it contained in its passage, and come over perfectly pure and free from phlegm. But these instruments are built upon erroneous principles, their extravagant height defeating the end it was designed to answer: if the liquor be made to boil, a considerable quantity of mere phlegm will come over along with the spirit; and if the heat be not raised to this pitch, neither phlegm nor spirit will distil. The most convenient instrument is the common still; between the body of which and its head an adouter or copper tube may be fixed.

The spirit being washed, as above directed, from its foul oil, and freed from the greatest part of the phlegm by gentle distillation in a water-bath, add to every gallon of it a pound or two of pure dry fixed alkaline salt. Upon digesting these together for a little time, the alkali, from its known property of attracting water and oils, will imbibe the remaining phlegm, and such part of the disagreeable unctuous matter as may still be left in the spirit, and will sink with them to the bottom of the vessel. If the spirit be now again gently drawn over, it will rise entirely free from its phlegm and nauseous flavour; but some particles of the alkaline salt are apt to be carried up with it, and give what the workmen call an *urinous relish*: this may be prevented by adding, previous to the last distillation, a small proportion of calcined vitriol, alum, or bitter cathartic salt; the acids of these salts will unite with and neutralize the alkali, and effectually prevent it from rising; while no more of the acid of the salts is extricated than what the alkali absorbs.

The spirit obtained by this means is extremely pure, limpid, perfectly flavourless, and fit for the finest purposes. It may be reduced to the strength commonly understood by proof, by mixing twenty ounces of it with seventeen ounces of water. The distilled cordials made with these spirits prove much more elegant and agreeable, than when the common rectified or proof-spirits of the shops are used.

If the rectified spirit be distilled afresh from dry alkaline salt with a quick fire, it brings over a considerable quantity of the salt; and in this state it is supposed to be a more powerful menstruum for certain

substances than the pure spirit. This alkalized spirit is called *tartarized spirit of wine*.

The process here described, which was long since recommended by Dr Lewis, will sufficiently explain the intention of the London college, in the directions they have now given for the preparation of alcohol. And there can be no doubt, that by their process a very pure alcohol may be obtained. Of this we have a sufficient test in the specific gravity of the fluid which comes over, which is to that of distilled water only as 815 to 1000, while the specific gravity of proper rectified spirit is as 835 to 1000.

Spirit of vitriolic æther. L.

Take of rectified spirit of wine, vitriolic acid, each one pound. Pour by a little at a time the acid on the spirit, and mix them by shaking; then from a retort through a tubulated receiver, to which another recipient is fitted, distil the spirit of vitriolic æther till sulphureous vapours begin to rise.

Vinous vitriolic acid, commonly called dulcified spirit of vitriol. E.

Take of vitriolic ethereal liquor, one part; rectified spirit of wine, two parts. Mix them.

The last of these processes is a very ready and convenient method of preparing the dulcified spirit of vitriol, which only differs from æther by the acid being more predominant, and less intimately combined.

In the first process, a good deal of caution is requisite in mixing the two liquors. Some direct the spirit of wine to be put first into the retort, and the oil of vitriol to be poured upon it all at once; a method of procedure by no means advisable, as a violent heat and ebullition always ensue, which not only dissipate a part of the mixture, but hazard also the breaking of the vessel, to the great danger of the operator. Others put the oil of vitriol into the retort first: then by means of a funnel, with a long pipe that may reach down just to the surface of the acid, pour in the spirit of wine; if this be done with sufficient caution, the vinous spirit spreads itself on the surface of the oil of vitriol, and the two liquors appear distinct. On standing for a week or two, the vinous spirit is gradually imbibed, without any commotion, and the vessel may then be safely shaken to complete the mixture: but if the spirit be poured in too hastily at first, or if the vessel be moved before the two liquors have in some degree incorporated, the same effect ensues as in the foregoing case. The only secure way is, to add the oil of vitriol to the spirit of wine by a little quantity at a time, waiting till the first addition be incorporated before another quantity is put in: by this management, the heat that ensues is inconsiderable, and the mixture is effected without any inconvenience.

The distillation should be performed with an equal and very gentle heat, and not continued so long as till a black froth begins to appear: for before this time a liquor will arise of a very different nature from the spirits here intended. The several products are most commodiously kept apart by using a tubulated receiver, so placed, that its pipe may convey the matter which shall come over into a vial set underneath. The juncture of the retort and recipient is to be luted with a

paste made of lintseed meal, and further secured by a piece of wet bladder; the lower juncture may be closed only with some soft wax, that the vial may be occasionally removed with ease.

The true dulcified spirit arises in thin subtile vapours, which condense on the sides of the recipient in straight striæ. It is colourless as water, very volatile, inflammable, of an extremely fragrant smell, in taste somewhat aromatic.

After the fire has been kept up for some time, white fumes arise; which either form irregular striæ, or are collected into large round drops like oil: On the first appearance of these, the vial, or the receiver, if a common one is used, must be taken away. If another be substituted, and the distillation continued, an acid liquor comes over, of an exceeding pungent smell, like the fumes of burning brimstone. At length a black froth begins hastily to arise, and prevents carrying the process further.

On the surface of the sulphureous spirit is found swimming a small quantity of oil, of a light yellow colour, a strong, penetrating, and very agreeable smell. This oil seems to be nearly of the same nature with the essential oils of vegetables. It readily and totally dissolves in rectified spirit of wine, and communicates to a large quantity of that menstruum the taste and smell of the aromatic or dulcified spirit.

The matter remaining after the distillation is of a dark blackish colour, and still highly acid. Treated with fresh spirit of wine, in the same manner as before, it yields the same production; till at length all the acid that remains unvolatilized being saturated with the inflammable oily matter of the spirit, the compound proves a bituminous sulphureous mass; which, exposed to the fire in open vessels, readily burns, leaving a considerable quantity of fixed ashes; but in close ones it explodes with violence; with fixed alkaline salts it forms a compound nearly similar to one composed of alkalis and sulphur.

The new names adopted by the London and Edinburgh colleges for this fluid, are expressive of its composition; the one employing the term of *spiritus ætheris vitriolici*, the other of *acidum vitriolicum vinosum*; the old term of *spiritus vitrioli dulcis* is less properly fitted to distinguish it from other fluids, and to convey a just idea of its nature.

Dulcified spirit of vitriol has been for some time greatly esteemed, both as a menstruum and a medicine. It dissolves some resinous and bituminous substances more readily than spirit of wine alone, and extracts elegant tinctures from sundry vegetables. As a medicine, it promotes perspiration and the urinary secretion, expels flatulencies, and in many cases abates spasmodic strictures, eases pains, and procures sleep. The dose is from ten to eighty or ninety drops in any convenient vehicle. It is not essentially different from the celebrated anodyne liquor of Hoffman; to which it is, by the author himself, not unfrequently directed as a succedaneum.

Of this fluid, however, or at least of an article still more nearly resembling it, we shall afterwards have occasion to speak, when we treat of the vinous spirit of vitriolic æther.

Vitriolic æther. L.

Take of the spirit of vitriolic ether, two pounds; wa-

ter of pure kali, one ounce. Shake them together, and distil, with a gentle heat, fourteen ounces by measure.

Vitriolic ethereal liquor. E.

Take of rectified spirit of wine, vitriolic acid, each thirty-two ounces. Pour the spirit into a glass retort fit for sustaining a sudden heat, and add to it the acid in an uniform stream. Mix them by degrees, frequently shaking them moderately; this done, instantly distil from sand previously heated for that purpose, into a receiver kept cool with water or snow. But the heat is to be so managed, that the liquor shall boil at first, and continue to boil till 16 ounces are drawn off; then let the retort be raised out of the sand.

To the distilled liquor add two drams of the common bitter caustic; then distil again in a very high retort with a very gentle heat, into a cool receiver, until ten ounces have been drawn off.

If sixteen ounces of rectified spirit of wine be poured upon the acid remaining in the retort after the first distillation, an ethereal liquor may be obtained by repeating the distillation. This may be done pretty often.

The preparation of this singular fluid, now received into public pharmacopœias, was formerly confined to a few hands; for though several processes have been published for obtaining it, the success of most of them is precarious, and some of them are accompanied also with danger to the operator. The principal difficulty consists in the first part of the distillation.

It has been usual to direct the heat to be kept up till a black froth begins to appear: but if it is managed in the manner here directed, the quantity of æther which the liquor can afford will be formed and drawn off before this sulphureous froth appears. The use of the caustic alkali is to engage any uncombined vitriolic acid which may be present in the first distilled liquor. If a mild alkali were employed for this purpose, the separation of its air by the acid might endanger the bursting of the vessels. This last is indeed an inconvenience which attends the whole of this process. It might in a great measure be obviated by employing a range of receivers such as the adopter described in the first part of this work.

The æther, or ethereal spirit, is the lightest, most volatile and inflammable of all known liquids. It is lighter than the most highly rectified spirit of wine, in the proportion of about 7 to 8: a drop, let fall on the hand, evaporates almost in an instant, scarcely rendering the part moist. It does not mix, or only in a small quantity, with water, spirit of wine, alkaline lixivium, volatile alkaline spirits, or acids; but is a powerful dissolvent for oils, balsams, resins, and other analogous substances: it is the only known substance capable of dissolving the elastic gum; it has a fragrant odour, which, in consequence of the volatility of the fluid, is diffused through a large space. It has often been found to give ease in violent headaches, by being applied externally to the part; and to relieve the toothach, by being laid on the afflicted jaw. It has been given also internally, with benefit, in hooping coughs, hysterical cases, in asthma, and indeed in almost every spasmodic affection, from a few drops to the

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the quantity of half an ounce, in a glass of wine or water; which should be swallowed as quickly as possible, as the æther so speedily exhales.

Spirit of nitrous æther. L.

351 Take of rectified spirit of wine, two pints; nitrous acid, half a pound. Mix them, by pouring in the acid on the spirit, and distil with a gentle heat one pound ten ounces.

Vinous acid of nitre; commonly called dulcified spirit of nitre. E.

Take of rectified spirit of wine, three pounds; nitrous acid, one pound. Pour the spirit into a capacious phial, placed in a vessel full of cold water, and add the acid by degrees, constantly agitating them. Let the phial be slightly covered, and laid by for seven days in a cool place; then distil the liquor with the heat of boiling water, into a receiver kept cool with water or snow, till no more spirit comes over.

By allowing the acid and rectified spirit to stand for some time, the union of the two is not only more complete, but the danger also of the vessels giving way to the ebullition and heat consequent on their being mixed, is in a great measure prevented. By fixing the degree of heat to the boiling point, the superabundant acid matter is left in the retort, being too ponderous to be raised by that degree of heat.

Here the operator must take care not to invert the order of mixing the two liquors, by pouring the vinous spirit into the acid; for if he should, a violent effervescence and heat would ensue, and the matter be dispersed in highly noxious red fumes. The most convenient and safe method of performing the mixture seems to be, to put the inflammable spirit into a large glass bottle with a narrow mouth, placed under a chimney, and to pour into it the acid, by means of a glass funnel, in very small quantities at a time; shaking the vessel as soon as the effervescence ensuing upon each addition ceases, before a fresh quantity is put in: by this means the glass will be heated equally, and be prevented from breaking. During the action of the two spirits upon each other, the vessel should be lightly covered: if close stopped, it will burst; and if left entirely open, some of the more valuable parts will exhale. Lemery directs the mixture to be made in an open vessel; by which unscientific procedure, he usually lost, as he himself observes, half his liquor; and we may presume, that the remainder was not the medicine here intended.

Several methods have been contrived for obviating the inconveniences arising from the elastic fluid and violent explosions produced on the mixture of the nitrous acid and rectified spirit of wine: for preparing the nitrous æther they are absolutely necessary, and might perhaps be conveniently used for making the dulcified spirit. The method we judge to be the best, is that employed by Dr Black. On two ounces of the strong acid put into a phial, the doctor pours, slowly and gradually, about an equal quantity of water; which, by being made to trickle down the sides of the phial, floats on the surface of the acid without mixing with it: he then adds, in the same cautious

manner, three ounces of highly rectified spirit of wine, which in its turn floats on the surface of the water. By this means the three fluids are kept separate on account of their different specific gravities, and a stratum of water is interposed between the acid and spirit. The phial is now set in a cool place: the acid gradually ascends, and the spirit descends through the water, this last acting as a boundary to restrain their violent action on each other. By this method a quantity of nitrous æther is formed, without the danger of producing elastic vapours or explosion.

For the preparation of the dulcified spirit, the liquors, when mixed together, should be suffered to rest for some time, as above directed, that the fumes may entirely subside, and the union be in some measure completed. The distillation should be performed with a very slow and well regulated fire; otherwise the vapour will expand with so much force as to burst the vessels. Wilson seems to have experienced the justness of this observation, and hence directs the juncture of the retort and receiver not to be luted, or but slightly: if a tubulated recipient, with a sufficiently long pipe, be used, and the distillation performed with the heat of a water-bath, the vessels may be luted without any danger: this method has likewise another advantage, as it ascertains the time when the operation is finished: examining the distilled spirit every now and then with alkaline salts, as directed above, is sufficiently troublesome; while in a water-bath we may safely draw over all that will rise; for this heat will elevate no more of the acid than what is dulcified by the vinous spirit.

Dulcified spirit of nitre has been long held, and not undeservedly, in great esteem. It quenches thirst, promotes the natural secretions, expels flatulencies, and moderately strengthens the stomach: it may be given from 20 drops to a dram, in any convenient vehicle. Mixed with a small quantity of spirit of hartshorn, the volatile aromatic spirit, or any other alkaline spirit, it proves a mild, yet efficacious, diaphoretic, and often remarkably diuretic; especially in some febrile cases, where such a salutary evacuation is wanted. A small proportion of this spirit added to malt spirits, gives them a flavour approaching to that of French brandy.

Spirit of ammonia. L.

Take of proof-spirit, three pints; sal ammoniac, four ounces; pot-ash, six ounces. Mix and distil with a slow fire one pint and an half.

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Vinous spirit of sal ammoniac. E.

Take of quicklime, 16 ounces; sal ammoniac, eight ounces; rectified spirit of wine, 32 ounces. Having slightly bruised and mixed the quicklime and ammoniacal salt, put them into a glass retort; then add the spirit, and distil in the manner directed for the volatile caustic alkali, till all the spirit has passed over.

This spirit has lately come much into esteem, both as a medicine and a menstruum. It is a solution of volatile salt in rectified spirit of wine; for though proof-spirit be used, its phlegmatic part does not rise in the distillation, and serves only to facilitate the action of the pure spirit upon the ammoniacal salt.

Rectified

Rectified spirit of wine does not dissolve volatile alkali salts by simple mixture: on the contrary, it precipitates them, as has been already observed, when they are previously dissolved in water: but by the present process, a considerable proportion of the volatile alkali is combined with the spirit. It might perhaps, for some purposes, be more advisable to use with this intention the volatile spirit made with quicklime; for this may be mixed at once with rectified spirit of wine, in any proportion, without the least danger of any separation of the volatile alkali.

The name here employed by the London college, particularly when put in contradistinction to the water of ammonia, conveys a clear idea of the article, and is, we think, preferable to that employed by the Edinburgh college.

As a menstruum, the spirit of ammonia is employed to dissolve essential oils, thus forming the volatile aromatic spirit, or *compound spirit of ammonia*, as it is now called by the London college, which again is employed in making the tinctures of guaiac, valerian, &c.

The chief medical virtues which the spirit of ammonia possesses, when exhibited by itself, are those of the volatile alkali.

Fetid spirit of ammonia.

353 Take of proof-spirit, six pints; sal ammoniac, one pound; asafœtida, four ounces; pot-ash, one pound and a half. Mix them, and draw off by distillation five pints, with a slow fire. *L.*

Take of vinous spirit of sal ammoniac, eight ounces; asafœtida, half an ounce. Digest in a close vessel 12 hours; then distil off with the heat of boiling water eight ounces. *E.*

This spirit, the last formula of which is in our opinion the best, as being most easily prepared without any risk of being injured in the preparation, is designed as an antihysterical, and is undoubtedly a very elegant one. Volatile spirits, impregnated for these purposes with different fetids, have been usually kept in the shops; the ingredient here made choice of, is the best calculated of any for general use, and equivalent in virtue to them all. The spirit is pale when newly distilled, but acquires a considerable tinge in keeping.

Compound spirit of aniseed. *L.*

354 Take aniseed, angelica-seed, of each, bruised, half a pound; proof-spirit, one gallon; water, sufficient to prevent an empyreuma. Draw off one gallon by distillation.

This compound spirit is now directed to be prepared by the London college in the same manner as in their former edition. It has no place in the Edinburgh pharmacopœia; but it may justly be considered as a very elegant aniseed water. The angelica seeds greatly improve the flavour of the anise. It is often employed with advantage, particularly in cases of flatulent cholera; but it has been alleged to be sometimes too frequently used with this intention as a domestic medicine, especially by old ladies: for unless it be prudently and cautiously employed, it may soon be attended with all the pernicious consequences of dram-drinking.

Spirit of caraway. *L.*

Take of caraway seeds, bruised, half a pound; proof-spirit, one gallon; water, sufficient to prevent an empyreuma. Draw off one gallon.

Spirituos caraway-water. *E.*

Take of caraway-seeds, half a pound; proof-spirit, nine pounds. Macerate two days in a close vessel; then pour on as much water as will prevent an empyreuma, and draw off by distillation nine pounds.

By this process the spirit obtains in great perfection the flavour of the caraway-seeds; and with some it is a cordial not uncommonly in use.

Spirit of cinnamon. *L.*

Take of bruised cinnamon one pound; proof-spirit, one gallon; water, sufficient to prevent an empyreuma. Draw off one gallon.

Spirituos cinnamon-water. *E.*

From one pound of cinnamon, nine pounds of spirit are to be drawn off, in the same manner as in the caraway spirit.

This is a very agreeable and useful cordial, but not so strong of the cinnamon as might be expected; for very little of the virtues of the spice arises till after the pure spirituous part has distilled. Hence, in the former editions of the London pharmacopœia, the distillation was ordered to be protracted till two pints more than here directed were come over. By this means, the whole virtue of the cinnamon was more frugally than judiciously obtained; for the disagreeable flavour of the feints of proof spirits, and the acidulous liquor arising from cinnamon as well as other vegetables when their distillation is long continued, give an ill relish to the whole; at the same time that the oil which was extracted from the spice was by this acid thrown down.

In the Pharmacopœia Reformata, it is proposed to make this spirit by mixing the simple cinnamon water with somewhat less than an equal quantity of rectified spirit: on shaking them together, the liquor loses its milky hue, soon becomes clear, and more elegant than the water distilled as above: it is equally strong of the cinnamon, and free from the nauseous taint with which the common proof-spirits are impregnated.

Compound spirit of juniper. *L.*

Take of juniper-berries, bruised, one pound; caraway-seeds, bruised, sweet-fennel seeds, of each one ounce and an half; proof-spirit, one gallon; water, sufficient to prevent an empyreuma. Draw off one gallon.

Compound juniper-water. *E.*

Take of juniper-berries, well bruised, one pound; seeds of caraway, sweet-fennel, each one ounce and a half; proof-spirit, nine pounds; macerate two days; and having added as much water as will prevent an empyreuma, draw off by distillation nine pounds.

This water, mixed with about an equal quantity of the rob of juniper-berries, proves an useful medicine.

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cine in catarrhs, debility of the stomach and intestines, and scarcity of urine. The water by itself is a good cordial and carminative: the service which this and other spirituous water do with these intentions is commonly known; though the ill consequences that follow from their constant use are too little regarded.

Spirit of lavender. L.

- 358 Take of fresh flowers of lavender, one pound and an half; proof-spirit, one gallon. Draw off by distillation in a water-bath, five pints.

Simple spirit of lavender. E.

Take of flowering spikes of lavender, fresh gathered, two pounds; rectified spirit of wine, eight pounds. Draw off by the heat of boiling water seven pounds.

This spirit, when made in perfection, is very grateful and fragrant: It is frequently rubbed on the temples, &c. under the notion of refreshing and comforting the nerves; and it probably operates as a powerful stimulus to their sensible extremities: it is likewise taken internally, to the quantity of a tea-spoonful, as a warm cordial.

Spirit of peppermint. L.

- 359 Take of the herb peppermint, dried, one pound and an half; proof-spirit, one gallon; water, sufficient to prevent an empyreuma. Draw off one gallon.

Spirituous peppermint-water. E.

From a pound and a half of these leaves nine pounds of spirit are drawn off, as from the caraway-seeds.

This spirit receives a strong impregnation from the peppermint. It is employed in flatulent colics and similar disorders; and in these it sometimes gives immediate relief: but where it is indicated, there are few cases in which the peppermint-water is not preferable.

Spirit of spearmint. L.

- 360 Take of spearmint, dried, one pound and an half; proof-spirit, one gallon; water, sufficient to prevent an empyreuma. Draw off one gallon.

This spirit has no place in the Edinburgh pharmacopœia. It, however, turns out a very elegant one, and preferable, in weakness of the stomach, retching to vomit, and the like, to many more elaborate preparations. Where the disorder is not accompanied with heat or inflammation, half an ounce of this water may be given diluted with some agreeable aqueous liquor: but, as was already observed with regard to the preceding article, there are many cases in which the prudent practitioner will be disposed to give the preference to the simple distilled water.

Spirit of nutmeg. L.

- 361 Take of bruised nutmegs, two ounces; proof-spirit, one gallon; water, sufficient to prevent an empyreuma. Draw off one gallon.

Spirituous nutmeg-water. E.

By two ounces of the nutmeg, well bruised, nine pounds of spirit are impregnated.

This is an agreeable spirituous liquor, highly impregnated with the nutmeg flavour. It was formerly celebrated in nephritic disorders, and when combined with a few hawthorn flowers, it had even the title of *nephritic water*. At present it is employed only as a cordial liquor, and is not even very frequently in use.

Spirit of pimento, or all-spice. L.

- Take of all-spice, bruised, two ounces; proof-spirit, one gallon; water, sufficient to prevent an empyreuma. Draw off one gallon.

Spirituous Jamaica-pepper water. E.

By half a pound of pimento nine pounds of spirit are to be impregnated.

This water is far more agreeable than a simple water drawn from the same spice; and had long a place among the cordials of the distiller before it was received into any public pharmacopœia: but although now adopted both by the London and Edinburgh colleges, it is not very frequently ordered from the shops of the apothecary.

Spirit of pennyroyal. L.

- Take of the herb pennyroyal, dried, one pound and an half; proof-spirit, one gallon; water sufficient to prevent an empyreuma. Draw off one gallon.

This spirit has no place in the Edinburgh pharmacopœia. It possesses, however, a considerable share of the flavour of the pennyroyal, and very frequently it is employed as a carminative and antihysterical.

Compound spirit of horse-radish. L.

- Take of fresh horse-radish root, dried outer-rind of Seville oranges, each two pounds; fresh herb of garden scurvy-grass, four pounds; bruised nutmegs, one ounce; proof-spirit, two gallons; water, sufficient to prevent an empyreuma. Draw off two gallons.

This spirit has long been considered as an elegant one, and is perhaps as well adapted for the purposes of an antiscorbutic as any thing that can be contrived in this form. It has been alleged, that the horse-radish and scurvy-grass join very well together, giving a similar flavour, though not a little disagreeable; that the nutmeg suppresses this flavour very successfully, without superadding any of its own; and that to this, orange-peel adds a flavour very agreeable. Arum root had formerly a place in this water, but is here deservedly thrown out; for it gives nothing of its pungency over the helm, notwithstanding what is asserted by some pharmaceutical writers to the contrary. Mustard-seed, though not hitherto employed in these kinds of compositions, would seem to be an excellent ingredient; it gives over the whole of its pungency, and is likewise less perishable than most of the other substances of this class: this seed wants no addition, excepting some aromatic material to furnish an agreeable flavour.

But although this process may furnish an agreeable compound spirit, yet it is much to be doubted, whether it possess those antiscorbutic powers for which it was once celebrated. And with this intention the Edinburgh college place so little confidence in it, that they have now rejected it from their pharmacopœia.

Spirit

Spirit of rosemary.

365

Take of fresh tops of rosemary, one pound and a half; proof-spirit, one gallon. Distil in a water-bath, five pints. *L.*

Take of flowering tops of rosemary, fresh gathered, two pounds; rectified spirit of wine, eight pounds. Distil in the heat of boiling water till seven pounds come over. *E.*

A spirit similar to this is generally brought to us from abroad, under the name of *Hungary-water*.

This spirit is very fragrant, so as to be in common use as a perfume: that brought from abroad is superior in fragrance to such as is generally made among us. In order to prepare it in perfection, the vinous spirit should be extremely pure; the rosemary tops gathered when the flowers are full blown upon them, and committed immediately to distillation, care being taken not to bruise or press them. The best method of managing the distillation, is that which was formerly recommended for the distillation of the more volatile essential oils and simple waters, viz. first to place the spirit in the still, and then set in, above the liquor, either an iron hoop, with a hair-cloth stretched over it, upon which the flowers are to be lightly spread, or rather a basket, supported on three pins, reaching down to the bottom. A gentle heat being applied, just sufficient to raise the spirit, its vapour lightly percolating through the flowers, will imbibe their finer parts, without making that disagreeable alteration, which liquors applied to such tender subjects, in their grosser form, generally do. Probably the superiority of the French Hungary-water, to that prepared among us, is owing to some skilful management of this kind, or to employing a perfectly pure spirit.

In the Wirtemberg pharmacopœia, some sage and ginger are added, in the proportion of half a pound of the former, and two ounces of the latter, to four pounds of the rosemary.

But the peculiar agreeable flavour of this water in all probability depends on the rosemary alone.

Carmelite water, or compound balm-water. *Dan.*

366

Take of fresh gathered leaves of balm, a pound and a half; the recent yellow rind of lemons, four ounces; nutmeg, coriander, each two ounces; cloves, cinnamon, each one ounce. The ingredients being sliced and bruised, pour upon them rectified spirit of wine, six pounds; balm-water, three pounds. Digest for three days, then draw off six pounds by distillation.

This spirit has been a good deal celebrated, particularly among the French, under the title of *Eau de Carmes*. Mr Beaumé, in his *Elemens de Pharmacie*, proposes some improvements on the process. After the spirit added to the ingredients has been drawn off in the heat of a water-bath, he orders the distilled liquor to be rectified by a second distillation, drawing off somewhat less than nine-tenths of it. He recommends, that all the aromatic spirits should be prepared in the same manner. When the common spirits of this kind are rubbed on the hands, &c. they leave, after the more volatile parts have exhaled, a disagreeable empyreumatic smell; and when diluted with water, and taken medicinally, they leave, in like manner, a nause-

ous flavour in the mouth. To remedy these imperfections, he made many experiments, which showed, that in order to obtain these liquors of the desirable qualities, the spirit must not only be perfectly pure at first, but that the liquor ought also to be rectified after it has been distilled from the subjects. In this rectification, only the more volatile, subtile, aromatic parts of the ingredients arise: there remains behind a white liquor, acrid, bitter, loaded only with the grosser oil, and deprived of all the specific flavour of the subjects. Indeed the very imperfection complained of naturally points out this second distillation as the remedy; for it shows the spirit to contain a grateful and ungrateful matter; the first of which exhales, while the other is left behind. The author says, that when the *aqua melisse* is prepared as above directed, it has something in it more perfect than any of the odoriferous spirits, whose excellence is cried up, and which have the reputation of being the best.

Aromatic spirituous liquors have in general less smell, when newly distilled, than after they have been kept about six months. M. Beaumé suspects that the preparations of this kind which have been most in vogue, were such as have been thus improved by keeping; and found that the good effects of age might be produced in a short time by means of cold. He plunges quart bottles of the liquor into a mixture of pounded ice and sea-salt; the spirit, after having suffered, for six or eight hours, the cold thence resulting, proves as grateful as that which has been kept for several years. Simple waters also, after being frozen, prove far more agreeable than they were before, though they are always less so than those which have been drawn with spirit, and exposed to a like degree of cold. This melioration of distilled waters by frost was taken notice of by Geoffroy.

Spirit of scurvy-grass. *Succ.*

Take of fresh scurvy-grass, bruised, 10 pounds; rectified spirit of wine, eight pints. With the heat of a water-bath, distil off four pints.

This spirit is very strong of the scurvy-grass; and has been given, in those cases where the use of this herb is proper, from 20 to 100 drops. The virtues of scurvy-grass reside in a very subtile, volatile oil, which arises in distillation both with water and pure spirit; and if the liquors are exposed to the air, soon exhales from both. The spirit, newly distilled, is extremely pungent; but if long kept, even in close vessels, it becomes remarkably less so: but it is not probable, that with such a pungent vehicle we can use a sufficient quantity of the herb to produce any permanent or considerable effect; it has been much recommended as a diuretic in dropsies.

The makers of this spirit have frequently added to the scurvy-grass a quantity of horse radish root, and sometimes substituted for it one drawn entirely from the horse-radish: the flavour of these two simples being so much alike, that their distilled spirits are scarcely distinguishable from each other. Here it may be observed, that though *arum* and *dracunculus* are usually ranked in the same class with the two foregoing vegetables, and considered as similar to them; this process discovers a remarkable difference: while the former

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yield all their pungency in distillation both to water and spirit; the latter give over nothing to either, and yet their virtues are destroyed in the operation.

Orange-peel water. Suec.

- 368 Take of recent orange skins, one pound; proof-spirit, three pounds. Draw off two pounds by the heat of a water-bath.

This spirit, which is now rejected from our pharmacopœias, had formerly a place in them under the title of *aqua corticum aurantium spirituosæ*. It is considerably stronger of the orange-peel than the simple water; and it is used as an useful cordial, stomachic, and carminative.

Aromatic spirit. Suec.

- 369 Take of the tops of rosemary, a pound and an half; tops of milfoil, thyme, each half a pound; proof-spirit, 16 pounds; macerate for two days, and draw off by distillation eight pounds. If before distillation eight pounds of vinegar be added, it forms the acetated aromatic spirit.

These preparations do not differ materially from the spirit of rosemary or Hungary water; for on the essential oil of the rosemary their medicinal properties may be considered as chiefly depending. They are often employed, particularly for external purposes, and for impregnating the air with their vapours, to destroy the influence of febrile contagions.

Antidieric spirit. Gen.

- 370 Take of spirit of turpentine, an ounce and an half; rectified spirit of wine, half a pound. Distil with a gentle heat. Let the oil swimming above in the receiver be separated from the saturated spirit, which is to be preserved for use.

It has been imagined, that this combination of oil of turpentine with ardent spirit will furnish an effectual solvent for biliary calculi. Hence the origin of the name here given it; but although it may have such an effect when copiously applied to the calculi in a glass vessel; yet this is not to be expected when it is taken into the stomach, and can only reach them in the course of circulation.

CHAP. XIX. *Decoctions and infusions.*

- 371 WATER, the direct menstruum of gums and salts, extracts readily the gummy and saline parts of vegetables. Its action, however, is not limited to these; the resinous and oily principles being, in most vegetables, so intimately blended with the gummy and saline, as to be in part taken up along with them: some of the resinous cathartics, and most of the aromatic herbs, as well as bitters and astringents, yield to water the greatest part of their smell, taste, and medicinal virtue. Even of the pure essential oils, and odorous resins of vegetables, separated from the other principles, water imbibes a part of the flavour; and by the artificial admixture of gummy or saline matter, the whole substance of the oil or resin is made soluble in water.

Of pure salts, water dissolves only certain determinate quantities: by applying heat, it is generally enabled to take up more than it can do in the cold, and

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this in proportion to the degree of heat; but as the liquor cools, this additional quantity separates, and the water retains no more than it would have dissolved without heat. With gummy substances, on the other hand, it unites unlimitedly, dissolving more and more of them till it loses its fluidity. Heat expedites the action of the water, but cannot enable it to take up more than it would do by allowing it longer time in the cold. The active parts extracted from most vegetables by water, and oils and resins made soluble in water by the artificial admixture of gum, partake of this property of pure gums, being soluble without saturation.

It has been imagined, that vegetables in a fresh state, while their oily, resinous, and other active parts are already blended with a watery fluid, would yield their virtues to water more freely and more plentifully than when their native moisture has been dissipated by drying. Experience, however, shows, that dry vegetables in general give out more than fresh ones, water seeming to have little action upon them in their recent state. If, of two equal quantities of mint, one be infused fresh in water, and the other dried, and then infused in the like quantity of water for the same length of time, the infusion of the dry herb will be remarkably the strongest: and the case appears to be the same in all the vegetables that have been tried.

In all the preparations described in this chapter, it is to be understood that the subjects must be moderately and newly dried, unless when they are expressly ordered to be taken fresh; in which case it is to be judged that their virtues are destroyed or impaired by drying.

The native colours of many vegetables are communicated to water along with their medicinal matter; many impart a colour different from their own; and others, though of a beautiful and deep colour themselves, give scarcely any to the menstruum. Of the first kind are the yellow and red flowers; of the second, the leaves of most plants; of the third, some of the blue flowers, as those of cyanus and larkspur. Acid liquors change the infusions of most flowers, the yellow ones excepted, to a red; and alkalis, both fixed and volatile, to a green.

From animal substances water extracts the gelatinous and nutritious parts; whence glues, jellies, broths, &c.; and along with these, it takes up principles of more activity, as the acrid matter of cantharides. It dissolves also some portion of calcined calcareous earths, both of the animal and of the mineral kingdom, but has no action on any other kind of earthy matter.

The effect of boiling differs from that of infusion in some material particulars. One of the most obvious differences is, that as the essential oils of vegetables, in which their specific odours reside, are volatile in the heat of boiling water, they exhale in the boiling along with the watery steam, and thus are lost to the remaining decoction; whereas both in cold, and sometimes in hot infusions, they are preserved; although in the latter they are by no means perfectly so. Odorous substances, and those in general whose virtues depend on their volatile parts, are therefore unfit for this treatment. The soluble parts of these may, nevertheless, be united in this form with those bodies of a more fixed nature, by boiling the latter till their vir-

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tues be sufficiently extracted, and then infusing the former in this decoction.

The extraction of the virtue of the subject is usually promoted or accelerated by a boiling heat; but this rule is less general than it is commonly supposed to be. We have already observed, that Peruvian bark gives out its virtue more perfectly by cold infusion than by coction. In some cases, boiling occasions a manifest disunion of the principles of the subject: thus, when almonds are triturated with cold water, their oil, blended with the mucilaginous or other soluble matter of the almond, unites with the water into a milky liquor called an *emulsion*: but on boiling them in water, the oil separates and rises to the surface; and if the most perfect emulsion be made to boil, a like separation happens.

This also appears to take place, though in a less evident manner, in boiling sundry other vegetables; thus tobacco, asarum, and ipecacuanha, lose their active powers by boiling: nor does it appear that this change is effected merely by the discharge of volatile parts. From some late experiments, it has been found, that the distilled water of ipecacuanha was infinitely less emetic than the infusion from which it was distilled, and that the boiling liquor gradually assumes a black colour, indicating some kind of decomposition of parts: the same circumstances probably take place in boiling tobacco, asarum, and perhaps all vegetables whatever, though from their not producing such sensible operations on the living body, they cannot be so clearly discovered as in ipecacuanha, tobacco, or asarum. The experiments we allude to were made by Dr Irving, when a student in the college of Edinburgh; and they gained him the prize given by the Harveian Society of that place, for the best experimental inquiry concerning ipecacuanha.

It is for the above-mentioned reasons that we think many of the infusions should be made with cold water: it is, however, to be acknowledged, that this is not always absolutely necessary, and in extemporaneous practice it may be often very inconvenient; it is, however, proper to point out the advantages to be expected from this more tedious, but much more complete and elegant, method.

Vinegar extracts the virtues of several medicinal substances in tolerable perfection: but at the same time its acidity makes a remarkable alteration in them, or superadds a virtue of a different kind; and hence it is more rarely employed with this intention than purely aqueous or spirituous menstua. Some drugs, however, for particular purposes, vinegar excellently assists, or coincides with, as squills, garlic, ammoniac, and others: and in many cases where this acid is itself principally depended on, it may be advantageously impregnated with the flavour of certain vegetables; most of the odoriferous flowers impart to it their fragrance, together with a fine purplish or red colour; violets, for instance, if fresh parcels of them are infused in vinegar in the cold for a little time, communicate to the liquor a pleasant flavour, and deep purplish red colour. Vinegar, like other acids, added to watery infusions or decoctions, generally precipitates a part of what the water had dissolved.

Decoction of marshmallows. E.

Take of dried marshmallow roots, four ounces; raisins of the sun, stoned, two ounces; water, seven pounds. Boil to five pounds; place apart the strained liquor till the feces have subsided, then pour out the clear liquor. 372

The Edinburgh college have substituted this for the more complicated formula of the *Decoctum ad Nephritis* of their former pharmacopœia, and it fully answers the intentions of that preparation: it is intended chiefly as an emollient, to be liberally drank of in nephritic paroxysms; in which cases, by softening and relaxing the parts, it frequently relieves the pain, and procures an easy passage for the fabulous matter. This medicine is now made more simple than before, without any diminution of its virtue, by the rejection of wild carrot seed, restharrow root, figs, linseed, and liquorice. The carrot seeds were indeed unfit for this form, as they give out little of their virtue to watery liquors.

Decoction of hartshorn. L.

Take of burnt and prepared hartshorn, two ounces; gum arabic, six drams; distilled water, three pints. Boil, constantly stirring, to two pints, and strain. 373

This decoction is used as common drink in acute diseases attended with a looseness, and where acrimonious humours abound in the primæ viæ. The gum is added, in order to render the liquor lightly glutinous, and thus enable it to sustain more of the calx; which is the ingredient on which the colour, but probably not the virtue, of the medicine depends. Calcined hartshorn has no quality from which it seems capable either of constringing and strengthening the vessels, giving a greater degree of consistency to thin fluids, or obtunding acrimonious humours. It blunts and absorbs acid juices; but acrimony and acidity are very different; there are few (perhaps none of the acute) disorders of adults attended with the latter; and few of infants are unaccompanied therewith. Some have proposed starch as an ingredient in these kinds of decoctions; a small quantity of this soft, gelatinous, farinaceous substance would seem to be greatly preferable to the earthy calx. It may be observed, that the water is not enabled by the boiling to dissolve any part of the calx; and that in the decoction, the earth is only diffused in substance through the water, as it would be by agitation.

For these reasons, this formula is now rejected by the Edinburgh college, notwithstanding the reputation in which it was held by Dr Sydenham, and other names of the first eminence. But as an absorbent of a similar nature, the Edinburgh college have introduced the following formula.

Chalk julep. E.

Take of prepared chalk, one ounce; purest refined sugar, half an ounce; mucilage of gum arabic, two ounces; rub them together; and add by degrees, water, two pounds and a half; spirituous cinnamon water, two ounces. Mix them. 374

In the former edition of the Edinburgh pharmacopœia,

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poëia, a preparation of this kind had the title of *decoc-
tum cretaceum*, and the chalk was directed to be boiled
with the water and gum. In the present formula, the
chalk is much more completely suspended by the mu-
cilage and sugar, which last gives also to the mixture
an agreeable taste; it is proper to employ the finest
sugar, as the redundant acid in the coarser kinds might
form with the chalk a kind of salt. It would perhaps
have been more proper to have added an aromatic, by
suspending the entire powder of cinnamon, or its oil,
by means of the mucilage and sugar: the method here
directed is, however, less exceptionable in this than in
many other preparations, as the precipitated matter of
the spirituous water will probably be inviscated in the
saccharine and mucilaginous matter. This is a very
elegant form of exhibiting chalk, and is an useful re-
medy in diseases arising from, or accompanied with,
acidity in the primæ viæ. It has been most frequent-
ly employed in fluxes proceeding from that cause. At
the same time that the mucilage serves to keep the
chalk uniformly diffused, it also considerably improves
its virtues by sheathing the internal surface of the in-
testines so often abraded in these affections. It is in-
deed probable, that chalk, as being somewhat astrin-
gent, is in some of these complaints preferable to mag-
nesia; both, however, are improper in dysentery, or
other fluxes attended with putrescent matter in the
primæ viæ, or a general tendency to a putrefaction of
the fluids.

Decoction of Peruvian bark. L.

- 375 Take of Peruvian bark, powdered, one ounce; distilled
water, one pint and three ounces. Boil, for ten mi-
nutes, in a covered vessel, and strain the liquor while
hot.

Although a cold watery infusion of bark is in ge-
neral preferable to any decoction, yet this form has at
least the advantage of being more quickly prepared.
And the decoction here directed, which is boiled only
for a short time, and strained while hot, is preferable
to any other.

This decoction should be passed only through a coarse
strainer, and drank while turbid: if suffered to stand till
clear, the more efficacious parts of the bark will subside.
We have formerly observed, that the virtues of this
drug consist chiefly in its resinous substance, which,
though it may be totally melted out by the heat of
boiling water, remains only partially suspended in that
menstruum.

Decoction for a clyster. L.

- 376 Take of the dried leaves of mallow, one ounce; dried
camomile-flowers, half an ounce; water, one pint.
Boil, and strain.

The title of this decoction sufficiently expresses its
use, as the basis of glysters. The ingredients should
be very lightly boiled, or at least the camomile flowers
should not be put in till towards the end, a part of
their virtue being soon lost by boiling.

Decoction for fomentation. L.

- 377 Take of the dried leaves of southernwood, the dried
tops of sea wormwood, dried camomile flowers, each
one ounce; dried bay-leaves, half an ounce; distilled
water, six pints. Boil them a little, and strain.

Common decoction. E.

Take of camomile flowers, one ounce; carvy seeds,
half an ounce; water, five pounds. Boil for a quar-
ter of an hour, and strain.

This decoction is intended to answer the purposes
of both the foregoing. It is less loaded with ingre-
dients than either, but not perhaps for that reason the
less useful.

It is indeed to be acknowledged, that these impreg-
nations are for the most part unnecessary for the pur-
pose of glysters; and in ordinary cases the weight of
the water usually solicits a discharge before these me-
dicines can produce any effect.

As to fomentations, their virtues in our opinion are
totally to be ascribed to the influence of the warm wa-
ter. And when the herbs themselves are applied, they
act only as retaining heat and moisture for a longer
time.

Decoction of hellebore. L.

Take of the root of white hellebore, powdered, one
ounce; distilled water, two pints; rectified spirit of
wine, two ounces. Boil the water with the root to
one pint; and, the liquor being cold and strained,
add to it the spirit.

White hellebore, as we formerly observed, is now
very rarely employed internally; and the present for-
mula is entirely intended for external use. Recourse
is sometimes had to it with advantage in cutaneous
eruptions, particularly in tinea capitis. But where the
incrustations are entirely removed, leaving a very ten-
der skin, it is necessary that the decoction should be
diluted previous to its employment.

Decoction of barley. L.

Take of pearl-barley, two ounces; distilled water, four
pints. The barley being first washed with cold wa-
ter from the adhering impurities, pour upon it about
half a pint of water, and boil the barley a little
time. This water being thrown away, add the di-
stilled water, boiling, to the barley; boil it to two
pints, and strain.

Compound decoction of barley. L.

Take of the decoction of barley, two pints; raisins,
stoned, figs, sliced, each two ounces; liquorice-root,
sliced and bruised, half an ounce; distilled water,
one pint. Boil to two pints, and strain.

Barley-water. E.

Take of pearl-barley, two ounces; water, five pints.
First wash the barley from the mealy matter that
adheres to it with some cold water; then boil it a
little with about half a pint of fresh water, which
will acquire a considerable tinge from it. Throw
away this tinged water; put the barley into the five
pints of boiling water prescribed; and continue the
boiling till half the water be wasted.

These liquors are to be drank freely as a diluter, in
fevers and other disorders; hence it is of consequence
that they should be prepared so as to be as elegant and
agreeable as possible; for this reason they are inserted
in the pharmacopœia, and the several circumstances
which contribute to their elegance set down; if any
one of them be omitted, the beverage will be less grate-
ful.

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ful. However trivial medicines of this class may appear to be, they are of greater importance in the cure of acute diseases than many more elaborate preparations.

Barley-water, however, is much more frequently prepared by nurses than apothecaries, particularly in its simple state. The compound decoction contains a large proportion of saccharine and mucilaginous matter, and may be employed for the same purposes as the decoction of marshmallows of the Edinburgh pharmacopœia.

Decoction of the woods. E.

- 383 Take of guaiacum saw-dust, three ounces; raisins of the sun, stoned, two ounces; saffras wood, shaved, liquorice, sliced, each one ounce; water, ten pounds. Boil the guaiacum and raisins with the water, over a gentle fire, to the consumption of one half; adding, towards the end, the saffras and liquorice. Strain out the liquor; and having suffered it to rest for some time, pour off the clear from the feces without expression.

This decoction is very well contrived; and if its use be duly continued, it will do great service in some cutaneous diseases, in what has been called foulness of the blood and juices, and in some disorders of the breast; particularly in phlegmatic habits. It may be taken by itself to the quantity of a quarter of a pint two or three times a day, or used as an assistant in a course of mercurial or antimonial alteratives; the patient in either case keeping warm, in order to promote the operation of the medicine. The saw-dust exposes a larger surface to the action of the water than the shavings, directed in the former edition of the pharmacopœia.

Decoction of sarsaparilla. L.

- 384 Take of the root of sarsaparilla, sliced, six ounces; distilled water, eight pints. Macerate for two hours, with an heat of about 195°; then take out the root, and bruise it; return the bruised root to the liquor, and again macerate it for two hours. Then, the liquor being boiled to four pints, press it out, and strain.

This decoction is an article in very common use, particularly in venereal affections. And there can be little doubt, that by this process the medical powers of the sarsaparilla are fully extracted. But it has of late been much questioned, whether this article be in any degree intitled to the high character which was once given of it. Some, as we have already observed, are even disposed to deny its possessing any medical property whatever: but the general opinion is, that it has somewhat of a diaphoretic effect; and this effect is more readily obtained when it is exhibited under the form of decoction than under any other.

Compound decoction of sarsaparilla. L.

- 385 Take of the root of sarsaparilla, sliced and bruised, six ounces; bark of the root of saffras, raspings of guaiacum-wood, liquorice root, bruised, of each one ounce; bark of the root of mezereon, three drams; distilled water, ten pints. Macerate, with a gentle heat, for six hours; then boil it down to five pints, adding, towards the end, the bark of the root of mezereon, and strain the liquor.

This compound decoction is an elegant mode of preparing an article once highly celebrated under the title of the *Lisbon diet drink*. That formula, for a long time after its first introduction into Britain, was kept a secret; but an account of the method of preparation was at length published in the *Physical and Literary Essays of Edinburgh*, by Dr Donald Monro. And of the formula there given, which is in many respects an unchemical one, the present may justly be considered as an improvement. Even in its original form, but still more in the present state, there can be no doubt, that it furnishes us with a very useful medicine, particularly in those obstinate ulcers originating from venereal infection, which resist the power of mercury. And it is highly probable, that its good effects principally depend on the impregnation it receives from the mezereon. Perhaps, however, even thus improved, it is more complicated and expensive than is necessary: at least we are inclined to think, that every advantage derived from it may with equal ease and certainty be obtained from impregnating with the mezereon, in the manner here directed, a simple decoction of the guaiacum, bardana, or althæa, without having recourse to several articles, or employing one so expensive as the sarsaparilla.

Decoction of seneka. E.

- Take of seneka, or rattlesnake root, one ounce; water, two pounds. Boil to sixteen ounces, and strain. 386
The virtues of this decoction will be easily understood from those of the root from which it is prepared. The dose, in hydropic cases, and rheumatic, or arthritic complaints, is two ounces, to be repeated three or four times a-day, according to its effect.

Decoction of elm. L.

- Take of the fresh inner bark of elm, bruised, four ounces; distilled water, four pints. Boil to two pints, and strain. 387
It has been chiefly, if not entirely, under this form of decoction, that the elm-bark has been employed for combating those cutaneous eruptions against which it has of late been so highly celebrated. Any experience which we have had of it, however, in actual practice, by no means confirms the very favourable account which some have given of its use.

Mucilage of starch. L.

- Take of starch, three drams; distilled water, one pint. 388
Rub the starch, by degrees adding the distilled water; then boil it a little time.
The mucilage thus formed of starch is very useful for answering these purposes where a glutinous substance is required, and in particular it is often successfully employed under the form of glyster.

Mucilage of gum arabic.

- Take of gum arabic, powdered, four ounces; boiling distilled water, eight ounces. Rub the gum with the water until it be dissolved. L. 389
Take of gum arabic, beat into powder, and warm water, each equal weights. Digest, and frequently stir them till the gum be dissolved, then press the solution through linen. E.

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It is very necessary to pass the mucilage through linen, in order to free it from pieces of wood and other impurities, which always adhere to the gum; the linen may be placed in a funnel.

Mucilage of gum arabic is very useful in many operations in pharmacy: it is also much used for properties peculiar to those substances of its own class, and of all the gums it seems to be the purest.

Mucilage of gum tragacanth. E.

- 390 Take of gum tragacanth, powdered, one ounce; hot water, eight ounces. Macerate twenty-four hours; then mix them, by rubbing briskly, that the gum may be dissolved; and press the mucilage through linen cloth.

This gum is more difficultly soluble in water than gum arabic, and seems to be considerably more adhesive; it is therefore fitter for forming troches, and such like purposes. It has been thought to be more peculiarly what has been called a *pectorat*, than the other gums; but this does not seem to be certainly founded. This mucilage is perhaps preferable to the foregoing in those operations in pharmacy where much tenacity is required; as in the suspension of mercury, or other ponderous bodies.

Mucilage of quince-seed. L.

- 391 Take of seeds of the quince, one dram; distilled water, eight ounces, by measure. Boil with a slow fire until the water thickens; then pass it through linen.

This is a pleasant soft mucilage, of a somewhat sweetish taste, and a light agreeable smell: in these respects, and in its easy solubility in water, it differs from the mucilage of gum tragacanth, to which some have supposed it similar: it has another difference, to its disadvantage, being apt to grow mouldy in keeping.

Compound infusion of gentian. L.

- 392 Take of the root of gentian, one dram; fresh outer-rind of lemons, half an ounce; dried outer rind of Seville oranges, one dram and an half. Boiling water, 12 ounces, by measure. Macerate for an hour, and strain.

Bitter infusion. E.

Take of gentian root, half an ounce; dried peel of Seville oranges, one dram; coriander seeds, half a dram; proof-spirit, four ounces; water, one pound. First pour on the spirit, and three hours thereafter add the water; then macerate without heat for a night, and strain.

These formulæ do not materially differ. That of the London college is the most expeditious mode of preparation; but that of the Edinburgh college possesses other advantages, which are in our opinion more than sufficient to outweigh that circumstance.

In the former edition of the Edinburgh pharmacopœia the water was directed to be boiling: this was at least unnecessary, and was probably liable to the objections observed against decoctions. The proof-spirit is also an useful addition to the bitter infusion, as it now stands in the Edinburgh pharmacopœia: besides that it assists in extracting the resinous parts, and pre-

serving the infusion from fermentation, it communicates an agreeable pungency to the liquor. To answer in some measure these intentions, it was formerly directed to add to the filtrated liquor a quantity of aromatic water. This was certainly a piece of very bad pharmacy; for, besides that the spirit in this preparation, when diluted with the water of the infusion, was now no longer able to retain the suspended matter, it would also dispose the infusion to part with its proper extractive matter; and in this way the resinous matter of the aromatic water, and the gummy parts of the bitter infusion, would both in some degree separate to the bottom of the vessel. By the formula now laid down, the infusion contains the different principles of the ingredients in a manner more nearly approaching to their natural and entire state.

Simple infusion of fenna. L.

Take of fenna, an ounce and a half; ginger, powdered, one dram; boiling distilled water, one pint. Macerate them for an hour in a covered vessel; and the liquor being cold, strain it.

This, although a simple, is a very elegant infusion of fenna, the ginger acting as an useful corrigent. But if the fenna were employed to the quantity of a dram and an half or two drams only, with the same menstruum, in place of the quantity here ordered, it would be a no less useful medicine, and might be employed for one dose, as it is best when fresh. Of the present infusion, an ounce or two is a sufficient dose.

Tartarized infusion of fenna. L.

Take of fenna, one ounce and a half; coriander seeds, bruised, half an ounce; crystals of tartar, two drams; distilled water, one pint. Dissolve the crystals of tartar by boiling in the water; then pour the water, as yet boiling, on the fenna and seeds. Macerate for an hour in a covered vessel, and strain when cold.

In the last edition of the London pharmacopœia this had the name of *infusum fennæ commune*.

Formerly an alkaline salt was used in the infusion of fenna instead of the acid one here directed. The first was supposed to promote the operation of the medicine, by superadding a degree of purgative virtue of its own, and by enabling the water to extract somewhat more from the capital ingredient than it would be capable of doing by itself; while acids were alleged to have rather a contrary effect. Experience, however, has sufficiently shown, that alkaline salts increase the offensiveness of the fenna, while crystals of tartar considerably improve the colour of the infusion, and likewise render the taste to some persons less disagreeable. Soluble tartar should seem a good ingredient to these kinds of compositions, as it not only improves the taste, but promotes the purgative virtue of the medicine: this addition also renders the infusion less apt to gripe, or occasion flatulencies.

Infusion of tamarinds with fenna. E.

Take of tamarinds, six drams; crystals of tartar, fenna, each one dram; coriander seeds, half a dram; brown sugarcandy, half an ounce; boiling water, eight ounces. Macerate in a close earthen vessel which has not been vitrified with lead; stir the liquor now and

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and then, and after it has stood four hours strain it. It may also be made with double, triple, &c. the quantity of senna.

Both this and the former infusions might be made with cold water. By this means the aromatic quality of the coriander seeds would probably be extracted in a more perfect state; but the crystals of tartar are so difficultly soluble in cold water, that for extemporaneous use it is in some measure necessary to prepare them in the manner here directed. It is not indeed probable, that when such soluble matters as acids and sugar are presented to water, the water shall be able to extract such a quantity of the finer volatile part of aromatics as to afford any considerable flavour to the liquor. Where an aromatic is required, we would therefore propose, that some agreeable aromatic water should be mixed with the liquor immediately before swallowing it; or that a quantity of aromatic oil should be incorporated with the cold infusion by means of gum, or a part of the sugar which might be reserved for that purpose. It is a very necessary caution not to make this infusion in vessels glazed with lead, otherwise the acid might corrode the lead, and communicate its poisonous effects to the infusion.

Both these infusions are mild and useful purges; the latter in particular is excellently suited for delicate stomachs, at the same time that it is very much calculated for febrile and other acute diseases. It is observable, that sugar added to neutral salts rather increases than diminishes their nauseousness; but when used along with an acid, such as tamarinds, or a salt wherein the acid predominates, as in crystals of tartar, it is found very much to improve their taste. The acid in this infusion, or rather the combination of acid and sweet, are found to cover the taste of the senna very effectually: the aromatic serves also the same purpose, but would perhaps be better applied in the way above proposed.

Infusion of the rose. L.

396 Take of red rose-buds, the heels being cut off, half an ounce; vitriolic acid, diluted, three drams; boiling distilled water, two pints and a half; double-refined sugar, one ounce and a half. To the water, first poured on the petals in a glass vessel, add the diluted vitriolic acid, and macerate for half an hour. Strain the liquor when cold, and add the sugar.

Infusion, commonly called tincture of roses. E.

Take of red roses, dried, one ounce; boiling water, five pounds; vitriolic acid, one dram; white sugar, two ounces. Macerate the roses with the boiling water in an unglazed vessel four hours; then having poured on the acid, strain the liquor, and add the sugar.

Some have directed the vitriolic acid to be dropped upon the roses before the water is put to them: but this method is certainly faulty; for such of the roses as this caustic liquor falls on undiluted will be burnt up by it, and have their texture destroyed. Others have made an infusion of the roses in water first, and then added the acid, from an apprehension, that if this acid be added to the water, it would weaken its power as a menstruum; but whatever the acid spirit will hinder the water from extracting, it must precipitate

if added afterwards; though, in this preparation, the vitriolic acid bears so small a proportion to the water, that its effects in this respect will be very little; and it appears to be of little consequence which of the two ways be followed, only that by the above formula the vessels are exposed a shorter time to the action of the acid. The infusion should be made in a glass or stone-ware vessel, rather than a glazed earthen one; for the acid will be apt to corrode the glazing of the latter.

This infusion is of an elegant red colour, and makes a very grateful addition to juleps in hæmorrhagies, and in all cases which require mild coolers and subastrin-gents. It is sometimes taken with boluses or elec-tuaries of the bark, and likewise makes a good gargle. But although in our pharmacopœias it has its name from the roses, yet its virtues are to be ascribed chiefly, or perhaps solely, to the vitriolic acid.

Infusion of rhubarb. E.

Take of rhubarb, half an ounce; boiling water, eight ounces; spirituous cinnamon water, one ounce. Ma-cerate the rhubarb in a glass vessel with the boiling water for a night; then having added the cinnamon water, strain the liquor.

In this infusion cold water might perhaps be em-ployed with advantage; we also object to the spiritu-ous cinnamon-water on the same grounds as we did before to the aromatic water in the bitter infusion of the former edition of the Edinburgh pharmacopœia. This, however, appears to be one of the best prepara-tions of rhubarb when designed as a purgative; water extracting its virtue more effectually than either vinous or spirituous menstrua. In this respect rhubarb differs from most of the other vegetable cathartics; and we think the London college might have given it a place in their pharmacopœia as well as the wine or tincture of rhubarb.

Lime-water.

Take of quicklime, half a pound; boiling distilled water, twelve pints. Mix, and set it aside in a covered vessel for an hour; then pour off the liquor, which keep in a close vessel. L.

Take half a pound of fresh-burnt quicklime, put it in-to an earthen vessel, and gradually sprinkle on it four ounces of water, keeping the vessel shut while the lime grows hot and falls into powder; then pour on it twelve pounds of water, and mix the lime thoroughly with the water by stirring. After the lime has subsided renew the stirring; and let this be done about ten times, always keeping the vessel shut (during the ebullition), that the access of the air may be the more effectually prevented. Lastly, let the water be filtered through paper placed in a funnel close shut at its top; and it must be kept in very close vessels. E.

The reason of adding the water by degrees to the lime is, that when poured on at once it reduces the external part to a kind of muddy substance, or soft paste, which in some measure defends the internal part from being acted on by the water. It does not appear that the different proportions of water in the two above prescriptions occasion any sensible difference in the strength of the product: the quicklime is far from yielding all its soluble parts to either proportion; the remainder

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remainder giving a strong impregnation to many fresh quantities of water, though not so strong as to the first. The caution of keeping the water in close-stopped vessels ought to be strictly attended to; for in open ones the calcareous matter dissolved in the liquor soon begins to separate, and forms a white crust on the surface. This crust is not of a saline nature, as some have imagined; but an insipid earth, no longer miscible with watery liquors. The theory of the production of this earth will be easily understood from what we have said on the article *FIXED AIR*. The separation first takes place at the surface, as being the part immediately applied to the common air. As long as the crust remains entire, the closeness of its texture so excludes the air, that the rest of the matter still remains impregnated with lime; but when this pellicle is broken by any means, it soon sinks to the bottom, and exposes a new surface for the separation of the lime. In this way a succession of crusts and precipitations are formed, till the whole of the once caustic and soluble quicklime is now found at the bottom of the vessel in the state of a mild insoluble earth, leaving the water perfectly insipid.

The formation of these crusts, and their successive precipitations, are owing to the absorption of fixed air, or aerial acid, from the atmosphere; and the mild insoluble state of these precipitations is also owing to the same cause.

The distilled water recommended by the London college is certainly preferable to common fountain water; the purity of which can rarely be depended on.

Lime-water has been thought of great service in scrofulous complaints; but perhaps on no very good foundation. It has also been used both internally and externally for various affections of the skin. It seems to be very considerably astringent, and has been useful in some kinds of alvine fluxes, in diabetes, leucorrhœa, and in sundry other disorders proceeding from a laxity or debility of the solids.

Its more common use is in affections of the stomach accompanied with acidity and flatulence. For which last complaint, the mild or aerated earths are less proper, on account of the separation of air on their meeting with an acid in the stomach. Lime-water is also capable of dissolving mucus; and may therefore be used where a redundancy of the intestinal mucus affords a nidus for worms, or gives rise to other complaints. It has also been found, that lime-water injected into the anus immediately kills ascarides. The lithontriptic powers of lime-water seem at present to be much doubted. Lime-water is given in doses proportioned to the nature of the complaints; in some cases, as in diabetes, it may be given in divided portions to the extent of two quarts a-day. It is used externally for washing what are called *foul or ill-conditioned ulcers*; it is also injected into the vagina and other parts affected with preternatural discharges from laxity.

The use of lime-water in scurvy is very doubtful.

Vinegar of squills.

399 Take of squills, dried, one pound; vinegar, six pints; proof-spirit, half a pint. Macerate the squills in the vinegar, with a gentle heat, in a glass vessel, for four-and-twenty hours; then press out the li-

quor, and set it by that the feces may subside: last-ly, pour off the liquor, and add to it the spirit. *L.* Take of dried root of squills, two ounces; distilled vinegar, two pounds and a half; rectified spirit of wine, three ounces. Macerate the squills with the vinegar eight days; then press out the vinegar, to which add the spirit; and when the feces have subsided, pour off the clear liquor. *E.*

Vinegar of squills is a medicine of great antiquity; we find in a treatise attributed to Galen, an account of its preparation, and of many particular virtues then ascribed to it. It is a very powerful stimulant, aperient, and what is called an attenuant of tenacious juices; and hence it is frequently used, with great success, in disorders of the breast occasioned by a load of thick phlegm, and for promoting urine in hydropic cases. The dose of this medicine is from a dram to half an ounce: where crudities abound in the first passages, it may be given at first in a larger dose, to evacuate them by vomiting. It is most conveniently exhibited along with cinnamon, or other agreeable aromatic waters, which prevent the nausea it would otherwise, even in small doses, be apt to occasion.

Aromatic vinegar. Suec.

Take of tops of rosemary, leaves of sage, each four ounces; flowers of lavender, two ounces; cloves two drams; vinegar, eight pounds. Macerate for four days, express the liquor, and strain it.

This may be considered as an elegant improvement of what had formerly a place in the foreign pharmacopœias, under the title of *acetum prophylacticum*, which contained not only the present articles, but also a confused farrago of others, as wormwood, rue, garlic, cinnamon, &c.

It is said, that during the plague at Marseilles, four persons, by the use of the acetum prophylacticum as a preservative, attended, unhurt, multitudes of those who were infected: that under colour of those services, they robbed both the sick and the dead: and that one of them being afterwards apprehended, saved himself from the gallows by discovering the remedy. The preparation was hence called *Vinaigre des quatre voleurs*; "The vinegar of the four thieves." It is not to be doubted that vinegar, impregnated with antiseptic vegetables, will contribute greatly to prevent the effects of contagious air. And in the present aromatic vinegar we have a stronger and better impregnation, than from the numerous articles which were before employed. We are far, however, from imagining that it will be able to counteract the contagion of the plague: but it may on different occasions be more powerful than vinegar in its simple state, for impregnating with antiseptic vapours the chambers of the sick.

Vinegar of roses. Suec.

Take of the flowers of red roses dried, any quantity; add to them twelve times their weight of vinegar. Macerate for four days, and strain through paper.

This has been chiefly used for embrocating the head and temples in some kinds of headach, &c. in which it has now and then been of service. It has also been used for certain cases of ophthalmia. But before it

can be applied to the eyes, it will in general require to be diluted with water.

Vinegar of lead. Succ.

- 402 Take of litharge, tritured, half a pound; vinegar, two pounds. Digest them together, frequently stirring the mixture with a wooden rod, till the colour of blue paper be not changed by the vinegar; preserve for use the clear liquor which is above the sediment.

This liquor is of the same nature with solutions of sugar of lead, or acetated ceruse, as it is now called. It is only used externally against cutaneous eruptions, redness, inflammations, &c. But even in these cases some think it is not void of danger: and it is alleged, that there are examples of its continued use having occasioned sundry ill consequences. Of this, however, we are very doubtful. But by means of the acetated ceruse every purpose to be answered by this may be accomplished. This liquor differs only in the proportions from the water of acetated litharge of the London pharmacopœia.

Vinegar of colchicum. Ros.

- 403 Take of the recent root of colchicum cut into slices, one ounce; vinegar, one pound. Macerate with a gentle heat for two days: then strain after slight expression.

Although in our pharmacopœias a place be given to the oxymel and syrup of colchicum, both of which are formed from the vinegar, yet the vinegar itself is not directed to be kept in its separate state: under this form, however, it may often be employed with advantage.

Infusion of Peruvian bark. Succ.

- 404 Take of Peruvian bark, bruised, an ounce and a half; river water, boiling, a pound and a half. Digest for two hours, shaking the vessel frequently; then strain the liquor with expression.

The Peruvian bark, as we have already had occasion to observe, gives out its medical properties to water not less readily in the way of infusion than of decoction. And in the former, the extractive matter is even more in a state of solution. An infusion, however, not only more elegant, but stronger than the present, might be obtained, from employing cold instead of boiling water, and from continuing the maceration for a greater length of time. But in whatever manner it be formed, an infusion will often sit on the stomach, when the bark either in substance or decoction cannot be retained.

Tar-water. Succ.

- 405 Take of tar two pounds; water, one gallon. Stir them strongly together with a wooden rod; and after standing to settle for twelve hours, pour off the water for use.

Tar-water has lately been recommended to the world as a certain and safe medicine in almost all diseases; a slow yet effectual alterative in cachexies, scurvy, chlorotic, hysterical, hypochondriacal, and other chronic complaints; and a sudden remedy in acute distempers which demand immediate relief, as pleuritis,

peripneumonies, the small-pox, and all kinds of fevers in general. The medicine, though certainly far inferior to the character that has been given of it, is doubtless in many cases of considerable utility: it sensibly raises the pulse; and occasions some considerable evacuation, generally by perspiration or urine, though sometimes by stool or vomit. Hence it is supposed to act by increasing the vis vitæ, and enabling nature to expel the morbid humours.

We shall here insert, from the first public recommendation of this liquor (Bishop Berkeley), some observations on the manner of using it. "Tar-water, when right, is not paler than French, nor deeper coloured than Spanish, white wine, and full as clear; if there be not a spirit very sensibly perceived, in drinking, you may conclude the tar water is not good. It may be drank either cold or warm. In colics, I take it to be best warm. As to the quantity, in common chronic indispositions, a pint a-day may suffice, taken on an empty stomach, at two or four times, viz. night and morning, and about two hours after dinner and breakfast: more may be taken by stronger stomachs. But those who labour under great and inveterate maladies, must drink a greater quantity, at least a quart every twenty-four hours. All of this class must have much patience and perseverance in the use of this, as well as of all other medicines, which, though sure, must yet in the nature of things be slow in the cure of inveterate chronic disorders. In acute cases, fevers of all kinds, it must be drank in bed warm, and in great quantity (the fever still enabling the patient to drink), perhaps a pint every hour, which I have known to work surprising cures. But it works so quick, and gives such spirits, that the patients often think themselves cured before the fever has quite left them."

Notwithstanding these encomiums, tar-water seems to be fast losing its reputation. It is not probable that water can take up any of the more active principles of the tar; and it would perhaps be more convenient to separate its acid by distillation, and mix it with water occasionally: for it is pretty certain, that the water can only take up the acid of the tar, perhaps charged with a very small quantity of oily matter in the state of an acid soap.

Decoction of catechu. Gen.

- Take of catechu, three drams; spring-water, two pounds: boil it to one pound; and add to the strained liquor, of syrup of quinces, three ounces.

This decoction may be considered as nearly similar to the decoctum japonicum, and decoctum terræ japonicæ of the former editions of our pharmacopœia: and like these it will be found a very agreeable and useful medicine in fluxes that are not critical or symptomatic, and in a weak lax state of the intestines. A spoonful or two may be taken every hour, or oftener: thus managed, it produces much better effects than if larger doses are given at once. But for extracting the powers of the catechu, boiling is not requisite. By simple infusion in warm water, all its active parts are readily and completely dissolved. It may in this manner also be readily united with cinnamon or other aromatics. And an infusum japonicum is, we think, a formula justly intitled to a place in our pharmacopœias.

CHAP. XX. *Medicated Wines.*

407 THE original intention of medicated wines was, that medicines, which were to be continued for a length of time, might be taken in the most familiar and agreeable form; by this means a course of remedies was complied with, notwithstanding the repugnance and aversion which the sick often manifest to those directly furnished from the shops; and hence the inferior sort of people had their medicated ales. Nevertheless, as vinous liquors excellently extract the virtues of several simples, and are not ill fitted for keeping, they have been employed as officinal menstrua also; and substances of the greatest efficacy are trusted in this form. As compounds of water and inflammable spirit, they take up such parts of vegetables and animals as are soluble in those liquors; though most of them abound at the same time with a mucilaginous or viscous substance, which renders them less effectual menstrua than purer mixtures of water and spirit. They contain likewise a subtile acid, which somewhat further obstructs their action on certain vegetable and animal matters; but enables them, in proportion to its quantity, to dissolve some bodies of the metallic kind, and thus impregnate themselves with the corroborating virtues of steel, the alterative and emetic powers of antimony, and the noxious qualities of lead.

To all the medicated wines, after they have been strained, you may add about one-twentieth their quantity of proof spirit, to preserve them from fermentation. They may be conveniently kept in the same kind of glass bottles that wines generally are for common uses, which should likewise be corked with the same care.

Wine of aloes. L.

408 Take of socotorine aloes, eight ounces; white canella, commonly called *winter's bark*, two ounces; Spanish white wine, six pints; proof-spirit, two pints. Powder the aloes and white canella separately; when mixed, pour on them the wine and spirit: afterwards digest for fourteen days, now and then shaking them; lastly, strain. It will not be amiss to mix white sand, cleansed from impurities, with the powder, in order to prevent the moistened aloes from getting into lumps.

Aloetic wine, or sacred tincture. E.

Take of socotorine aloes, one ounce; lesser cardamom seeds, ginger, each one dram; Spanish white wine, two pounds. Digest for seven days, stirring now and then, and afterwards strain.

This medicine has long been in great esteem, not only as a cathartic, but likewise as a stimulus; the wine dissolving all that part of the aloes in which these qualities reside, a portion only of the less active resinous matter being left. The aromatic ingredients are added to warm the medicine, and somewhat alleviate the ill flavour of the aloes: white canella, or cloves, are said, among numerous materials that have been tried, to answer this end the most successfully; hence the introduction of the former of these into the formula of the London college.

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The sacred tincture appears from long experience to be a medicine of excellent service in languid, phlegmatic habits, not only for cleansing the primæ viæ, but likewise for stimulating the solids, warming the habit, promoting or exciting the uterine purgations, and the hæmorrhoidal flux. The dose, as a purgative, is from one to two ounces or more. It may be introduced into the habit, so as to be productive of excellent effects, as an alterant, by giving it in small doses, at proper intervals: thus managed, it does not for a considerable time operate remarkably by stool; but at length proves purgative, and occasions a lax habit of much longer continuance than that produced by the other common cathartics.

Bitter wine. E.

409 Take of root of gentian, half an ounce; Peruvian bark, one ounce; Seville orange-peel, dried, two drams; white canella, one dram; proof spirit, four ounces; Spanish white-wine, two pounds and a half. First pour on the spirit, after twenty-four hours add the wine; then macerate for three days, and strain.

This wine is intended to supply the place of the stomachic tincture, as it was formerly called. The wine is a menstruum fully capable of extracting the active powers of the different ingredients; and it supplies us with a very useful and elegant stomachic medicine, answering the purposes intended much better than the celebrated elixir of Van Helmont, and other unchemical and uncertain preparations, which had formerly a place in our pharmacopœias.

Wine of antimony. L.

Take of vitrified antimony, powdered, one ounce; Spanish white wine, a pint and an half. Digest for twelve days, frequently shaking the vessel, and filter the wine through paper.

Antimonial wine. E.

410 Take of glass of antimony, finely powdered, one ounce; Spanish white wine, fifteen ounces. Macerate for three days, stirring them now and then, and afterwards strain the liquor through paper.

However carefully the settling and decantation are performed, the filtration of the wine through paper appears to be necessary, lest some of the finer parts of the glass should chance to remain suspended in substance. It is not here, as in most other wines and tinctures, where the matter left undissolved by the menstruum is of little consequence; the antimonial glass, after the action of the wine, continues as virulent as ever, and capable of impregnating fresh parcels of the liquor as strongly as the first, and this, in appearance, inexhaustibly. After thirty repeated infusions, it has been found scarce sensibly diminished in weight.

The antimonial wine possesses the whole virtues of that mineral, and may be so dosed and managed as to perform all that can be effected by any antimonial preparation; with this advantage, that as the active part of the antimony is here already dissolved and rendered miscible with the animal fluids, its operation is more certain. Given from ten to fifty or sixty drops, it generally acts as an alterative and diaphoretic; in larger doses, as a diuretic and cathartic; while three or four drams prove for the most part violently emetic.

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It has been chiefly used with this last intention, in some maniacal and apoplectic cases; and hence it gained the name of *emetic wine*.

The quantity of the reguline part must, however, vary according to the proportions of the acid matter in different wines, and the operation of the medicine must be thereby less certain in degree; the vitrum is preferable to the crocus for making this preparation. See the different preparations of *Antimony*.

Wine of tartarized antimony. L.

- 411 Take of tartarized antimony, two scruples; boiling distilled water, two ounces; Spanish white wine, eight ounces; dissolve the tartarized antimony in the boiling distilled water, and add the wine.

Wine of antimonial tartar. E.

Take of antimonial tartar, commonly called *emetic tartar*, twenty four grains; and dissolve it in a pound of Spanish white wine.

Watery solutions of emetic tartar, on standing, precipitate a part which is less completely in a saline state; by this means, and especially if the solution be not shaken before using it, the dose of that medicine is somewhat ambiguous: in the above formula, the acid matter of the wine increases the saline state of the antimony, and therefore its solubility, whereby the operation of the medicine is more certain, and in many cases more powerful. From the certainty of its effects, this preparation might be very convenient in large hospitals or armies, where great numbers of the sick, and inaccurate nursing, frequently occasion an uncertain or dangerous practice.

In the formula employed by the Edinburgh college, each ounce of the wine contains two grains of the tartarized antimony; but in that of the London college, each ounce of the menstruum contains four grains: hence, while an ounce of the one may be employed for exciting full vomiting, the same quantity of the other would be too strong a dose. It is much to be regretted, that, in articles of this active nature, the proportions employed by the two colleges should differ so considerably: and it would perhaps have been better, had the London college adopted the proportions employed by that of Edinburgh, as they have followed them in adopting this formula.

Wine of iron. L.

- 412 Take of filings of iron, four ounces; Spanish white wine, four pints. Digest for a month, often shaking the vessel, and then strain.

This formula of the London pharmacopœia is now not only simplified, but improved, when compared with their former *vinum chalybeatum*: for the cinnamon and other articles which were then conjoined with the iron, were certainly rather prejudicial than otherwise; but at the same time, Rhenish wine, formerly employed, is perhaps to be considered as a better menstruum than the Spanish wine now directed. It may still, however, be justly considered as a good chalybeate; and we think the Edinburgh college have done wrong in rejecting the formula from their pharmacopœia.

By the London college it was formerly prepared by maceration, without heat; now, however, they direct digestion for the space of a month. Some have ob-

jected to the use of heat, that it impregnated the wine more strongly with the metal, and thus rendered it more unpleasant to the taste: but if this was the only inconvenience, the remedy would be easy, diluting it with more wine. Heat has another effect, much less desirable, and which art cannot remedy; making a disagreeable alteration in the quality of the wine itself: hence it is necessary that it should be very moderate.

Steel-wine is a very useful preparation of this metal, and frequently exhibited in chlorotic and other indispositions where chalybeates are proper. Boerhaave recommends it as one of the noblest medicines he was acquainted with for promoting that power in the body by which blood is made, when weakened by a bare debility of the over-relaxed solids, and an indolent, cold, aqueous indisposition of the juices: for in this case, says he, no virtue of any vegetable or animal substance, no diet, nor regimen, can effect that which is effected by iron: but it proves hurtful where the vital powers are already too strong, whether this proceeds from the fluids or the solids. The dose is from a dram to half an ounce; which may be repeated two or three times a-day.

Some direct solutions of iron, made in wine or other vegetable acids, to be evaporated to the consistence of an extract, under the title of *extractum martis*. These preparations have no advantage, in point of virtue, above the common chalybeates: though in some forms, that of pills in particular, they may be rather more commodiously exhibited than most of the officinal chalybeates of equal efficacy. They may be made into pills by themselves, and are tenacious enough to reduce other substances into that form.

Wine of ipecacuanha. L.

- Take of the root of ipecacuanha, bruised, two ounces; Spanish white wine, two pints. Digest for ten days, and strain. 413

Wine, or tincture, of ipecacuanha. E.

Take of ipecacuanha, in powder, one ounce; Spanish white wine, fifteen ounces. After three days maceration, let the tincture be filtrated for use.

Both these wines are very mild and safe emetics, and equally serviceable in dysenteries also with the ipecacuanha in substance; this root yielding nearly all its virtues to the Spanish white wine here ordered, as it does a good share of them even to aqueous liquors. The common dose is an ounce, more or less, according to the age and strength of the patient. The college of Edinburgh added formerly a scruple of cochineal, which imparts a fine red colour to the liquor: this article is now omitted, on a complaint that the red colour of the matters evacuated sometimes alarmed the patient, as if it proceeded from a discharge of blood.

Wine of millepeds. E.

- Take of live millepeds, bruised, one ounce; Rhenish wine, eight ounces. Infuse them together for twelve hours, and afterwards press the liquor through a strainer. 414

This wine has been commended as an admirable cleanser of all the viscera, yielding to nothing in the jaundice and obstructions of the kidneys or urinary passages,

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passages, of excellent service in almost all chronical distempers, even in scrofulous and strumous swellings, and in defluxions of rheum upon the eyes. But those who expected these extraordinary virtues from it have often been deceived; and at present there are few who have any great dependence on it; and hence it is omitted by the London college, probably without any loss. It is directed to be given from half an ounce to two ounces.

Wine of rhubarb. L.

415

Take of sliced rhubarb, two ounces and an half; lesser cardamom-seeds, bruised and husked, half an ounce; saffron, two drams; Spanish white wine, two pints; proof-spirit, eight ounces. Digest for ten days, and strain.

Rhubarb-wine. E.

Take of rhubarb, two ounces; white canella, one dram; proof-spirit, two ounces; Spanish white wine, fifteen ounces. Macerate for seven days, and strain.

By assisting the solvent power of the menstruum, the proof-spirit in the above formulæ is a very useful addition. This is a warm, cordial, laxative medicine. It is used chiefly in weakness of the stomach and bowels, and some kinds of loosenesses, for evacuating the offending matter, and strengthening the tone of the viscera. It may be given from half a spoonful to three or four spoonfuls or more, according to the circumstances of the disorder, and the purposes it is intended to answer.

Tobacco-wine.

416

Take of the dried leaves of the best Virginian tobacco, one ounce; Spanish white wine, one pound. Macerate for four days, and then strain the liquor.

We have already, under the article NICOTIANA, offered some observations on its late introduction into practice by Dr Fowler, as a very useful remedy in the cure of dropsies and dysurics. From his treatise on that subject the present formula is taken; and we may observe, that while in practice we have frequently experienced from the tobacco those good effects for which Dr Fowler recommends it, we are inclined to give the present formula the preference to every other which he has proposed. It seems to extract more fully the active principles of the tobacco than either water or spirit taken separately. For further observations on the medical virtues of tobacco, see the article NICOTIANA.

Squill-wine. Suec.

417

Take of dried squill, sliced, one ounce; ginger, one dram; French white wine, two pounds. Macerate for three days, and then strain.

By the wine employed as a menstruum, the active properties of the squills may be readily extracted; and in some cases at least the present formula may justly be considered as intitled to a preference over either the vinegar or oxymel of squills, which have a place in our pharmacopœias. The ginger here added to the squills operates as an useful corrigent; and on this account the present formula is preferable to the squill-wine of some other pharmacopœias, where the squills alone are used: For it is chiefly used in those cases where it is

intended that the squills should exert their effects, not on the alimentary canal, but on the kidneys or other excretories.

Zedoary wine. Dan.

Take of the root of zedoary, gently bruised, two pounds; spirit of wine, eight pounds. Let them be macerated for a month; then add spring water, eight pounds. Distil from thence twelve pounds.

Though this formula has the name of a wine, yet it is in reality a distilled spirit, nothing from the zedoary but a portion of its essential oil being united with the ardent spirit: and we are inclined to think, that the active powers of this article, both as depending on aroma and bitterness, might be better obtained by a simple infusion in Spanish white wine.

CHAP. XXI. *Tinctures.*

RECTIFIED spirit of wine is the direct menstruum of the resins and essential oils of vegetables, and totally extracts these active principles from sundry vegetable matters, which yield them to water either not at all, or only in part. It dissolves likewise the sweet saccharine matter of vegetables; and generally those parts of animal bodies in which their peculiar smell and taste reside.

The virtues of many vegetables are extracted almost equally by water and rectified spirit; but in the watery and spirituous tinctures of them there is this difference, that the active parts in the watery extractions are blended with a large proportion of inert gummy matter, on which their solubility in this menstruum in a great measure depends, while rectified spirit extracts them almost pure from gum. Hence, when the spirituous tinctures are mixed with watery liquors, a part of what the spirit had taken up from the subject generally separates and subsides, on account of its having been freed from that matter which, being blended with it in the original vegetable, made it soluble in water. This, however, is not universal; for the active parts of some vegetables, when extracted by rectified spirit, are not precipitated by water, being almost equally soluble in both menstrea.

Rectified spirit may be tinged by vegetables of all colours except blue: the leaves of plants in general, which give out but little of their natural colour to watery liquors, communicate to spirit the whole of their green tincture, which for the most part proves elegant, though not very durable.

Fixed alkaline salts deepen the colour of spirituous tinctures; and hence they have been supposed to promote the dissolving power of the menstruum, though this does not appear from experience: in the trials that have been made to determine this affair, no more was found to be taken up in the deep-coloured tinctures than in the paler ones, and often not so much: if the alkali be added after the extraction of the tincture, it will heighten the colour as much as when mixed with the ingredients at first. Nor does the addition of these salts make tinctures useless only, but likewise prejudicial, as they in general injure the flavour of aromatics, and superadd a quality, sometimes contrary to the intention of the medicine. Volatile alkaline salts, in many cases, promote the action of the spirits. A-

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cids generally weaken it; unless when the acid has been previously combined with the vinous spirit into a compound of new qualities, called *dulcified spirit*.

Tincture of wormwood. E.

- 420 Take of the flowering tops of wormwood, properly dried, four ounces; rectified spirit of wine, two pounds. Macerate for two days; then press out the spirit, and pour it on two ounces of wormwood. Macerate again for four days; then press the tincture through a cloth, and afterwards strain it through paper.

The aromatic parts of wormwood are more especially found in the flowering tops, and its bitterness in the leaves: but as the latter are replete with a mucilaginous matter, which might impede the action of the menstruum on the aromatic parts in this very elegant formula, the flowering tops are infused first, and their tincture made to extract the bitter parts of the leaves and stalks. This preparation may therefore be considered as containing the whole virtues of the plant.

In the tincture of wormwood we have one of the strongest of the vegetable bitters. It is sometimes used as an anthelmintic, and still more frequently in stomach ailments: But to most people it is a very disagreeable medicine.

Tincture of aloes. L.

- 421 Take of socotorine aloes, powdered, half an ounce; extract of liquorice, an ounce and an half; distilled water, proof-spirit, of each eight ounces. Digest in a sand-bath, now and then shaking the vessel, until the extract be dissolved, and then strain.

In this simple tincture all the active parts of the aloes, whether of a gummy or resinous nature, are suspended in the menstruum. The extract of liquorice serves both to promote the suspension and to cover the taste of the aloes; and in these cases where we wish for the operation of the aloes alone, without the aid either of an adjuvans or corrigens, this is perhaps one of the best formulæ under which aloes can be exhibited in a fluid state.

Compound tincture of aloes. L.

- 422 Take of tincture of myrrh, two pints; saffron, socotorine aloes, of each three ounces. Digest for eight days, and strain.

Elixir of aloes, commonly called elixir proprietatis. E.

Take of myrrh in powder, two ounces; socotorine aloes, an ounce and a half; English saffron, one ounce; rectified spirit of wine, proof-spirit, of each one pound. Digest the myrrh with the spirit for the space of four days; then add the aloes in powder, and the saffron; continue the digestion for two days longer, suffer the feces to subside, and pour off the clear elixir.

These two formulæ, though the mode of preparation be somewhat varied, do not materially differ from each other; and both may be considered as being the *elixir proprietatis* of Paracelsus, improved with regard to the manner of preparation. The myrrh, saffron, and aloes, have been usually directed to be digested in the spirit together: by this method, the menstruum soon

loads itself with the latter, so as scarcely to take up any of the myrrh; while a tincture, extracted first from the myrrh, readily dissolves a large quantity of the others. The alkaline salt, commonly ordered in these preparations with a view to promote the dissolution of the myrrh, we have already observed to be useless; and accordingly it is now omitted. Instead of employing the rectified spirit alone, the Edinburgh college have used an equal portion of proof-spirit, which is not only a more complete menstruum, but also renders the medicine less heating.

This medicine is highly recommended, and not undeservedly, as a warm stimulant and aperient. It strengthens the stomach and other viscera, cleanses the first passages from tenacious phlegm, and promotes the natural secretions in general. Its continued use has frequently done much service in cachectic and icteric cases, uterine obstructions, and other similar disorders; particularly in cold pale phlegmatic habits. Where the patient is of a hot bilious constitution and florid complexion, this warm stimulating medicine is less proper, and sometimes prejudicial. The dose may be from twenty drops to a tea-spoonful or more, two or three times a-day, according to the purposes which it is intended to answer.

Vitriolic elixir of aloes, or proprietatis. E.

Take of myrrh, socotorine aloes, each an ounce and a half; English saffron, one ounce; dulcified spirit of vitriol, one pound. Digest the myrrh with the spirit for four days in a close vessel; then add the saffron and aloes. Digest again four days; and when the feces have subsided pour off the elixir.

The Edinburgh college have reformed this preparation considerably; and especially by directing the myrrh to be digested first, for the same reasons as were observed on the preceding article. Here the dulcified spirit of vitriol is very judiciously substituted for the spirit of sulphur, ordered in other books of pharmacy to be added to the foregoing preparation; for that strong acid precipitates from the liquor great part of what it had before taken up from the other ingredients; whereas, when the acid is previously combined with the vinous spirit, and thereby dulcified, as it is called, it does not impede its dissolving power. This elixir possesses the general virtues of the preceding, and is, in virtue of the menstruum, preferred to it in hot constitutions and weaknesses of the stomach.

Aromatic tincture. E.

Take of cinnamon, six drams: lesser cardamom-seeds, one ounce; garden-angelica root, three drams; long pepper, two drams; proof-spirit, two pounds and an half. Macerate for seven days, and filter the tincture.

This preparation is improved from the preceding editions by the omission of some articles, either superfluous or foreign to the intention; galangal, gentian, zedoary, bay-berries, and calamus aromaticus. As now reformed, it is a sufficiently elegant warm aromatic.

This very warm aromatic is too hot to be given without dilution. A tea-spoonful or two may be taken in wine or any other convenient vehicle, in languors,

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weakness of the stomach, flatulencies, and other similar complaints; and in these cases it is often employed with advantage.

Tincture of asafetida. L.

- 425 Take of asafetida, four ounces; rectified spirit of wine, two pints. Digest with a gentle heat for six days, and strain.

Fetid tincture. E.

Take of asafetida, two ounces; vinous spirit of sal ammoniac one pound. Macerate for six days in a close shut vessel, and strain.

Of these two formulæ, the last is perhaps most generally useful: The vinous spirit of sal ammoniac is not only a more powerful menstruum than the rectified spirit of wine, but also coincides with the general virtues of the remedy.

This tincture possesses the virtues of the asafetida itself; and may be given from ten drops to fifty or sixty. It was first proposed to be made with proof-spirit; this dissolves more of the asafetida than a rectified one; but the tincture proves turbid; and therefore rectified spirit, which extracts a transparent one, is very justly preferred where ardent spirit is to be employed: and with this menstruum we can at least exhibit the asafetida in a liquid form to a greater extent.

Tincture of balsam of Peru. L.

- 426 Take of balsam of Peru, four ounces; rectified spirit of wine, one pint. Digest until the balsam be dissolved.

The whole of the Peruvian balsam is dissolved by spirit of wine: this therefore may be considered as a good method of freeing it from its impurities; while at the same time it is thus reduced to a state under which it may be readily exhibited: but at present it is very little employed, unless in composition, either under this or any other form.

Tincture of balsam of Tolu.

- 427 Take of balsam of Tolu, one ounce and an half; rectified spirit of wine, one pint. Digest until the balsam be dissolved, and strain. *L.*

Take of balsam of Tolu, an ounce and an half; rectified spirit of wine, one pound. Digest until the balsam be dissolved, and then strain the tincture. *E.*

This solution of balsam of Tolu possesses all the virtues of the balsam itself. It may be taken internally, with the several intentions for which that valuable balsam is proper, to the quantity of a tea-spoonful or two, in any convenient vehicle. Mixed with the plain syrup of sugar, it forms an elegant balsamic syrup.

Compound tincture of benzoin. L.

- 428 Take of benzoin, three ounces; storax strained, two ounces; balsam of Tolu, one ounce; socotorine aloes, half an ounce; rectified spirit of wine, two pints. Digest with a gentle heat for three days, and strain.

Traumatic balsam. E.

Take of benzoin, three ounces; balsam of Peru, two ounces; hepatic aloes, half an ounce; rectified spi-

rit of wine, two pounds. Digest them in a sand bath for the space of ten days, and then strain the balsam.

Although the London college have changed the name of this composition, yet they have made very little alteration on the formula which, in their last edition, had the name of *Traumatic balsam*; a name which it still retains in the Edinburgh pharmacopœia; and both may be considered as elegant contractions of some very complicated compositions, which were celebrated under different names; such as Baume de Commandeur, Wade's balsam, Friar's balsam, Jesuit's drops, &c. These, in general, consisted of a confused sarago of discordant substances. They, however, derived considerable activity from the benzoin and aloes; and every thing to be expected from them may readily be obtained from the present formulæ.

The compound tincture of benzoin, or traumatic balsam, stands highly recommended, externally, for cleansing and healing wounds and ulcers, for discussing cold tumors, allaying gouty, rheumatic, and other old pains and aches; and likewise internally, for warming and strengthening the stomach and intestines, expelling flatulencies, and relieving colic complaints. Outwardly, it is applied cold on the part with a feather; inwardly, a few drops are taken at a time, in wine or any other convenient vehicle.

There is, however, reason to think that its virtues have been considerably over-rated; and at present it is much less employed than formerly, recourse being chiefly had to it in cases of recent wounds, with the view of stopping hæmorrhagies, and of promoting healing by the first intention, as it is called.

Tincture of the Spanish fly.

Take of bruised cantharides, two drams; cochineal, powdered, half a dram; proof-spirit, one pint and an half. Digest for eight days, and strain. *L.*

Take of cantharides, one dram; proof spirit, one pound. Digest for four days, and strain through paper. *E.*

These tinctures possess the whole virtues of the fly, and are the only preparations of it designed for internal use: tinctures being by far the most commodious and safe form for the exhibition of this active drug. The two tinctures are scarcely different in virtue from each other. The cochineal is used only as a colouring ingredient: the gum-guaiacum, camphor, and essential oil of juniper-berries, which were formerly added, however well adapted to the intentions of cure, could be of little consequence in a medicine limited to so small a dose. If any additional substances should be thought requisite for promoting the effect of the cantharides, whether as a diuretic, as a detergent in ulcerations of the urinary passages, or as a specific restraining of seminal gleets and the fluor albus, they are more advantageously joined extemporaneously to the tincture, or interposed by themselves at proper intervals. The usual dose of these tinctures is from ten to twenty drops; which may be taken in a glass of water, or any other more agreeable liquor, twice a-day; and increased by two or three drops at a time, according to the effect.

The tincture of cantharides has of late been highly celebrated as a successful remedy in diabetic cases; and

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and in some instances of this kind, its use has been pushed to a very considerable extent, without giving rise to any stragurious affections: But we have not found it productive of a change for the better in any of those cases of diabetes in which we have tried it.

Tincture of cardamom.

- 430 Take of lesser cardamom seeds, husked and bruised, three ounces; proof-spirit, two pints. Digest for eight days, and strain. *L.*

Take of lesser cardamom-seeds, six ounces; proof-spirit, two pounds and a half. Macerate for eight days, and strain through paper. *E.*

Tincture of cardamom has been in use for a considerable time. It is a pleasant, warm cordial; and may be taken, along with any proper vehicle, from a dram to a spoonful or two.

Compound tincture of cardamom. L.

- 431 Take of lesser cardamom seeds, husked, caraway-seeds, cochineal, each, powdered, two drams; cinnamon, bruised, half an ounce; raisins, stoned, four ounces; proof-spirit, two pints. Digest for fourteen days, and strain.

This tincture contains so small a proportion of cardamoms as to be hardly intitled to derive its name from that article; and from the large proportion of raisins which it contains, the influence of the aromatics must be almost entirely prevented, while, at the same time, from these it cannot be supposed to obtain any active impregnation.

Tincture of cascarilla. L.

- 432 Take of the bark of cascarilla, powdered, four ounces; proof-spirit, two pints. Digest with a gentle heat for eight days, and strain.

Proof-spirit readily extracts the active powers of the cascarilla; and the tincture may be employed to answer most of those purposes for which the bark itself is recommended: But in the cure of intermittents, it in general requires to be exhibited in substance.

Tincture of castor.

- 433 Take of Russia castor, powdered, two ounces; proof-spirit, two pints. Digest for ten days, and strain. *L.*

Take of Russia castor, an ounce and a half; rectified spirit of wine, one pound; digest them with a gentle heat for six days, and afterwards strain off the liquor. *E.*

An alkaline salt was formerly added in this last prescription, which is here judiciously rejected, as being at least an useless, if not a prejudicial, ingredient. It has been disputed, whether a weak or rectified spirit, and whether cold or warm digestion, are preferable for making this tincture. To determine this point, the following experiment has been mentioned. "Some fine Siberia castor having been infused in good French brandy, without heat, for twenty days, the tincture proved very weak: On the same individual castor (the magma or residuum of the former tincture) the same quantity of rectified spirit was poured as before of brandy; and after a few hours warm digestion, a tincture was extracted much stronger than the other." But this experiment is not satisfactory: the effects of

the two menstrua, and of heat, having been respectively compared in very different circumstances.

From other trials, it appears that castor, macerated without heat, gives out its finer and most grateful parts to either spirit, but most perfectly to the rectified. That heat enables both menstrua to extract greatest part of its grosser, and more nauseous matter; and proof-spirit extracts this last more readily than rectified.

The tincture of castor is recommended in most kinds of nervous complaints and hysteric disorders: In the latter it sometimes does service, though many have complained of its proving ineffectual. The dose is from twenty drops to forty, fifty, or more.

Compound tincture of castor. E.

Take of Russia castor, one ounce; asafœtida, half an ounce; vinous spirit of sal ammoniac, one pound. Digest for six days in a close stopped phial, frequently shaking the vessel; and then strain the tincture.

This composition is a medicine of real efficacy, particularly in hysterical disorders, and the several symptoms which accompany them. The spirit here used is an excellent menstruum, both for the castor and the asafœtida, and greatly adds to their virtues.

Tincture of catechu. L.

Take of catechu, three ounces; cinnamon, bruised, two ounces; proof-spirit, two pints. Digest for three days, and strain.

Japonic tincture. E.

Take of Japan earth, three ounces; cinnamon, two ounces; proof-spirit, two pounds and a half. After digestion for eight days, let the tincture be passed through a strainer.

A tincture of this kind, with the addition of Peruvian bark, ambergris, and musk, to the ingredients above directed, was formerly kept in the shops. The tincture here received is preferable for general use: where any other ingredients are required, tinctures of them may be occasionally mixed with this in extemporaneous prescription. The cinnamon is a very useful addition to the catechu, not only as it warms the stomach, &c. but likewise as it improves the roughness and astringency of the other.

The tincture is of service in all kinds of defluxions, catarrhs, loosenesses, uterine fluors, and other disorders, where mild astringent medicines are indicated. Two or three tea-spoonfuls may be taken every now and then in red wine, or any other proper vehicle.

Tincture of cinnamon.

Take of cinnamon, bruised, one ounce and an half; proof-spirit, one pint. Digest for ten days, and strain. *L.*

Take of cinnamon, three ounces; proof-spirit, two pounds and a half. Macerate for eight days, and strain. *E.*

The tincture of cinnamon possesses the restringent virtues of the cinnamon, as well as its aromatic cordial ones; and in this respect it differs from the distilled waters of that spice.

Compound

Compound tincture of cinnamon. L.

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Take of cinnamon, bruised, six drams; lesser cardamom-seeds, husked, three drams; long pepper, ginger, of each, in powder, two drams; proof-spirit, two pints. Digest for eight days and strain.

From the different articles which this tincture contains, it must necessarily be of a more hot and fiery nature than the former, though much less strongly impregnated with the cinnamon.

Tincture of colomba. L.

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Take of colomba-root, powdered, two ounces and an half; proof-spirit, two pints. Digest for eight days, and strain.

The colomba readily yields its active qualities to the menstruum here employed; and accordingly, under this form, it may be advantageously employed against bilious vomitings, and those different stomach ailments, in which the colomba has been found useful; but where there does not occur some objection to its use in substance, that form is in general preferable to the tincture, which is now for the first time introduced into the London pharmacopœia.

Tincture of orange peel. L.

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Take of the fresh exterior peel of Seville oranges, three ounces; proof spirit, two pints. Digest for three days, and strain.

By this menstruum, both the bitter quality of the orange skins, and likewise their peculiar essential oil, are extracted: hence it may be employed for any purpose in medicine which these are capable of answering. It is, however, but rarely used; and, as well as the former, has now only for the first time a place in the London pharmacopœia.

Tincture of Peruvian bark. L.

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Take of Peruvian bark, powdered, four ounces; proof-spirit, two pints. Digest with a gentle heat for eight days, and strain. *L.*

Take of Peruvian bark, four ounces; proof-spirit, two pounds and a half. Digest for ten days, and strain. *E.*

A medicine of this kind has been for a long time pretty much in esteem, and usually kept in the shops, though but lately received into the pharmacopœias. Some have employed highly-rectified spirit of wine as a menstruum; which they have taken care fully to saturate, by digestion on a large quantity of the bark. Others have thought of assisting the action of the spirit by the addition of a little fixed alkaline salt, which does not however appear to be of any advantage; and others have given the preference to the vitriolic acid, which was supposed, by giving a greater consistence to the spirit, to enable it to sustain more than it would be capable of doing by itself; at the same time that the acid improves the medicine by increasing the roughness of the bark. This last tincture, and that made with rectified spirit, have their advantages; though, for general use, that above directed is the most convenient of any, the proof-spirit extracting nearly all the virtues of the bark. It may be given from a tea spoonful to half an ounce, or an

ounce, according to the different purposes it is intended to answer.

Compound tincture of Peruvian bark. L.

Take of Peruvian bark, powdered, two ounces; exterior peel of Seville oranges, dried, one ounce and an half; Virginian snake-root, bruised, three drams; saffron, one dram; cochineal, powdered, two scruples; proof-spirit, twenty ounces. Digest for fourteen days, and strain.

This has been for a considerable time celebrated under the title of *Huxham's tincture of bark*.

The substances here joined to the bark, in some cases, promote its efficacy in the cure of intermittents, and not unfrequently are absolutely necessary. In some ill habits, particularly where the viscera and abdominal glands are obstructed, the bark, by itself, proves unsuccessful, if not injurious; while given in conjunction with stimulating stomachics and deobstruents, it more rarely fails of the due effect. Orange-peel and Virginian snake-root are among the best additions for this purpose; to which it is thought by some necessary to join chalybeate medicines also.

As a corroborant and stomachic, it is given in doses of two or three drams; but when employed for the cure of intermittents, it must be taken to a greater extent. For this purpose, however, it is rarely employed, unless with those who are averse to the use of the bark in substance, or whose stomachs will not retain it under that form.

Tincture of saffron. E.

Take of English saffron, one ounce; proof-spirit, fifteen ounces. After digesting them for five days, let the tincture be strained through paper.

This tincture is similar in virtue to the saffron wine. A spirituous menstruum is here preferred to the wine, as a tincture drawn with the former retains its elegant colour longer, and is not apt to deposite in keeping any part of what it had taken up from the saffron. The shops have been accustomed to employ treacle water as a menstruum for saffron, with a view to the promoting its efficacy with the intention of operating as an alexipharmac; but the acid in that compound water soon destroys the colour of the tincture.

Tincture of muriated iron. L.

Take of the rust of iron, half a pound; muriatic acid, three pounds; rectified spirit of wine, three pints. Pour the muriatic acid on the rust of iron in a glass vessel; and shake the mixture now and then during three days. Set it by that the feces may subside; then pour off the liquor: evaporate this to one pint, and, when cold, add to it the vinous spirit.

Tincture of iron. E.

Take of the scales of iron, purified and powdered, three ounces; muriatic acid, as much as is sufficient to dissolve the powder. Digest with a gentle heat; and the powder being dissolved, add of rectified spirit of wine as much as will make up of the whole liquor two pounds and a half.

Of these two formulæ, that of the Edinburgh college is, in our opinion, in several respects intitled to the

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the preference. The scales are much fitter for giving a proper solution than the rust. The strength of the muriatic acid is so variable, that the quantity is left to the judgment of the operator. If the acid be superabundant, the solution is of a green colour; if it be fully saturated with the iron, it is more or less of a reddish or yellow colour; and this serves as a pretty accurate criterion. As the muriatic acid combines less intimately with rectified spirit than any of the fossil acids, so the after-process of dulcification scarcely, if at all, impairs the solvent power of the acid; though, when the dulcification happens to be more than usually complete, a small quantity of ferruginous matter is sometimes precipitated on adding the rectified spirit to the solution. But as the rectified spirit increases the volatility of the acid, so if it was added at first, we should lose much more of the menstruum by the heat employed during the digestion. When this tincture is well prepared, it is of a yellowish-red colour; if the acid be superabundant, it is more or less of a greenish hue; and if the rectified spirit has been impregnated with the astringent matter of oak casks, it assumes an inky colour.

All the tinctures of iron are no other than real solutions of the metal made in acids, and combined with vinous spirits. The tinctures here directed differ from each other only in strength, the acid being the same in both. In our former pharmacopœias, there was a tincture from the matter which remains after the sublimation of the martial flowers; which, though it appears to be a good one, is now expunged as superfluous. Some have recommended dulcified spirit of nitre as a menstruum; but though this readily dissolves the metal, it does not keep it suspended. The marine is the only acid that can be employed for this purpose.

These tinctures are greatly preferable to the calces or croci of iron, as being not only more speedy, but likewise more certain in their operation. The latter, in some cases, pass off through the intestinal tube with little effect; while the tinctures scarce ever fail. From ten to twenty drops of either of the tinctures may be taken two or three times a-day, in any proper vehicle; though it is seldom advisable to extend the dose of any tinctures of iron so far as the last of these quantities, especially with the tincture in spirit of salt, which is exceedingly strong of the iron.

Tincture of foot. E.

444 Take of shining wood-foot, one ounce; asafœtida, half an ounce; rectified spirit of wine, proof-spirit, of each half a pound. Digest for six days, and strain.

The proof-spirit is not liable to any objection here, as giving a turbid tincture; for when foot is added, whatever spirit be employed, the tincture will not prove transparent. Fuller, in his Pharmacopœia Domestica, has a medicine under the title of *hysteric tincture*, similar to this, only with a little myrrh, which is no very material addition to asafœtida and foot. These medicines are found serviceable, not only in hysteric cases, but likewise in other nervous disorders. They may be given from a tea-spoonful to a table-spoonful twice a-day.

This medicine has by some been thought serviceable

in obstructions of the menses; but its activity may be considered as depending much more on the asafœtida than on the foot.

Tincture of galbanum. L.

Take of galbanum, cut into small pieces, two ounces; proof-spirit, two pints. Digest with a gentle heat for eight days, and strain. 445

This tincture is now for the first time introduced by the London college, and may be usefully employed for answering several purposes in medicine. Galbanum is one of the strongest of the fetid gums; and although less active, yet much less disagreeable than asafœtida: and under the form of tincture it may be successfully employed in cases of flatulence and hysteria, where its effects are immediately required, particularly with those who cannot bear asafœtida.

Compound tincture of gentian. L.

Take of gentian root, sliced and bruised, two ounces; exterior dried peel of Seville oranges, one ounce; lesser cardamom seeds, husked and bruised, half an ounce; proof-spirit, two pints. Digest for eight days, and strain. 446

Bitter tincture, or stomachic elixir. E.

Take of gentian-root, two ounces; Seville orange-peel, dried, one ounce; white canella, half an ounce; cochineal, half a dram; proof-spirit, two pounds and a half. Macerate for four days, and strain through paper.

These are very elegant spirituous bitters. As the preparations are designed for keeping, lemon-peel, an excellent ingredient in the watery bitter infusions, has, on account of the perishableness of its flavour, no place in these. The aromatics are here a very commodious ingredient, as in this spirituous menstruum they are free from the inconvenience with which they are attended in other liquors, of rendering them untransparent.

Elixir of guaiacum. E.

Take of gum-guaiacum, one pound; balsam of Peru, three drams; rectified spirit of wine, two pounds and a half. Digest for ten days, and strain. 447

This tincture may be considered as nearly agreeing in medical virtues with the two following. It is, however, less in use; but it may be employed with advantage in those cases where an objection occurs to the menstruum used in forming the others.

Tincture of gum-guaiacum. L.

Take of gum-guaiacum, four ounces; compound spirit of ammonia, a pint and a half. Digest for three days, and strain. 448

Volatile elixir of guaiacum. E.

Take of gum-guaiacum, four ounces; balsam of Peru, two drams; distilled oil of sassafras, half a dram; vinous spirit of sal ammoniac, a pound and an half. Macerate for six days in a close vessel, and strain.

In the last of these formulæ, the vinous spirit of sal ammoniac is less acrimonious than the menstruum directed by the London college; and the balsam of Peru, and distilled oil of sassafras, are useful additions, by

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